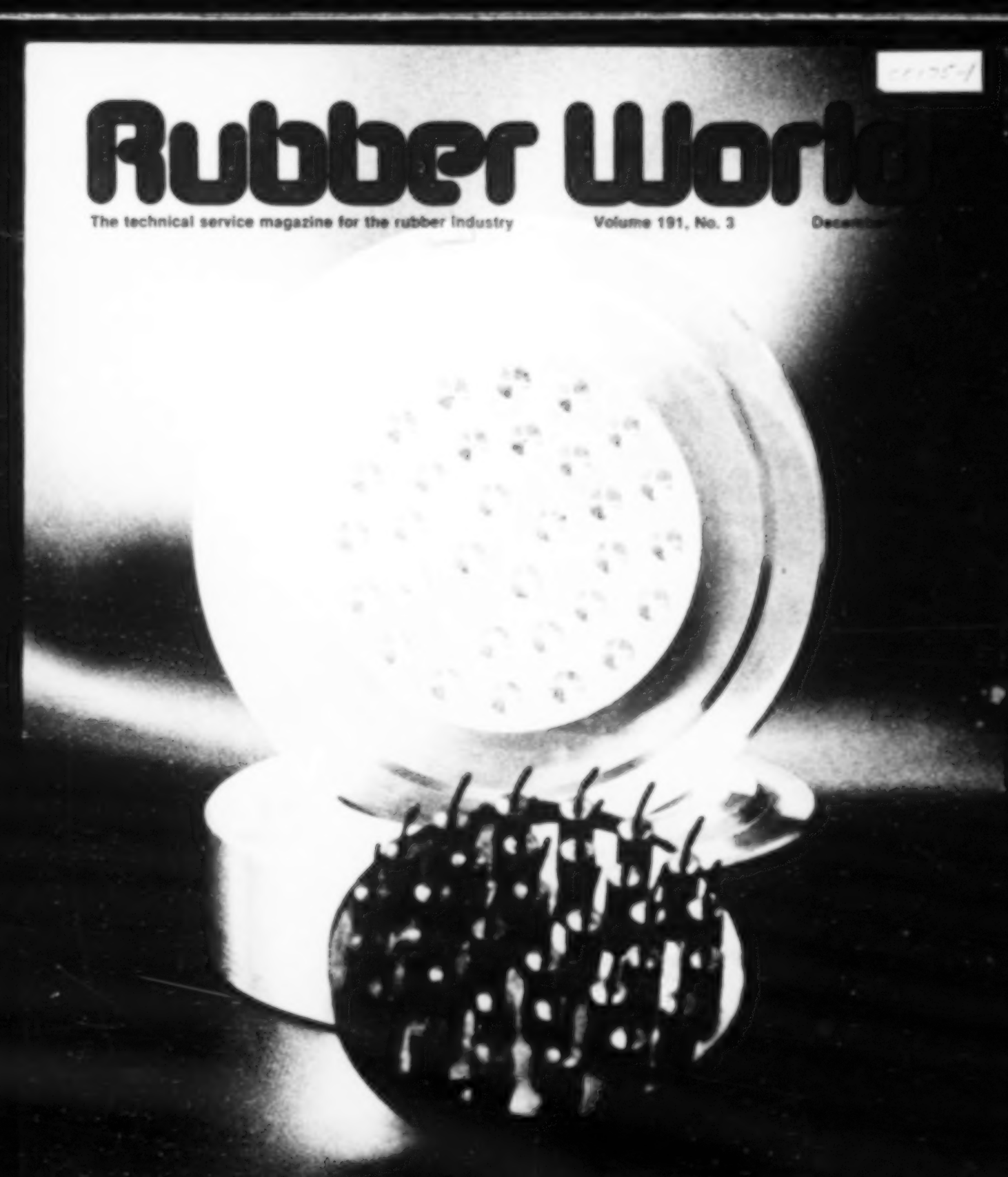
Rubber World

The technical service magazine for the rubber industry

Volume 191, No. 3 Dece



A new approach to ventless molding

Designing for dynamic isolation and motion control

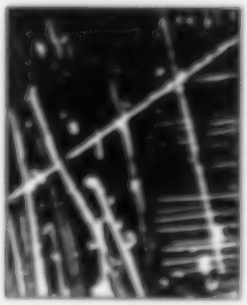
High temperature adhesion of glass fiber cloth

Contents

Vol. 191, No. 3/December 1984

Ventless molding p. 18

Designing with elastomers p. 22



Glass fiber adhesion p. 32

6 Business Briefs
Acquisitions, expansions, contracts, licenses, financial statements, price changes, markets, news

14 Tech Service — Controlling the situation
by Jon Menough, contributing technical service editor. Close tolerances can be obtained in the extrusion process and one such instance is detailed.

18 A new approach to ventless molding
by Jerome J. Blayne and James Sides, BFGoodrich. Authors describe the practice of steam purging for removing air from the mold.

22 Design with elastomers for dynamic isolation and motion control
by Andrew D. Campuzy, Lord Corp. Author presents an overview of the considerations important in the design of elastomeric isolators which requires the interrelationship of several areas of technology.

32 High temperature adhesion of glass fiber cloth
by S. Bandyopadhyay, C.K. Das and M. Chakrobortty, I.I.T., India. Authors look at a polysulfide silane coupling agent for glass fiber cloth.

38 New Patents
edited by Bob Samples, Akron Rubber Development

41 Technical Focus — Computer technology is enhancing rubber chemistry
by David Given, technical editor. Microprocessors have given the chemist more freedom while increasing productivity in the lab.

46 Techno Mart
New materials, instruments, equipment, products and CAD/CAM.

Departments

4	Editorial	40	Calendar	54	Literature
38	Meetings	50	Jobs & People	56	Advertisers Index

Cover

Cover photo courtesy of BFGoodrich Chemical

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Business Briefs

Acquisitions, expansions

GAF Corp. will spend $95 million in the next two years in expanding its chemical plants in Calvert City, KY, Texas City, TX and Marl, West Germany and its roofing materials plants. The first phase calls for a 40% capacity expansion for butynediol and butanediol.

Union Chemicals is expanding SBR latex capacity by 40 million pounds annually at its Charlotte, NC plant to be on stream in May 1985.

MKB Industries has moved into a greatly expanded facility in Stratford, CT.

Witco Chemical's acquisition of **Continental Carbon** was for $23 million the company said.

Cooper Tire made the final payment of a 20 year lease/purchase option agreement on its El Dorado, AR plant.

BFGoodrich purchased a **CBS Inc.** vinyl compounding plant in Terre Haute, IN with an annual capacity of more than 60 million pounds.

N.V. Bekaert S.A. has taken over the activities of **Omag Composites N.V.**, a designer and manufacturer of reinforced plastic components.

Alkar, Inc. is undergoing a 10,500 sq. ft. expansion of its rubber machinery rebuilding operations in Kent, OH.

Semperit of Austria is investing AS 1,000 million at its Wimpassing facility. The largest portion will be a new hose factory with substantial sums going for increasing capacity for medical gloves and a new molded component factory.

CasChem has added 22 million pounds per year capacity for a new line of proprietary polyols at its Bayonne, NJ facility.

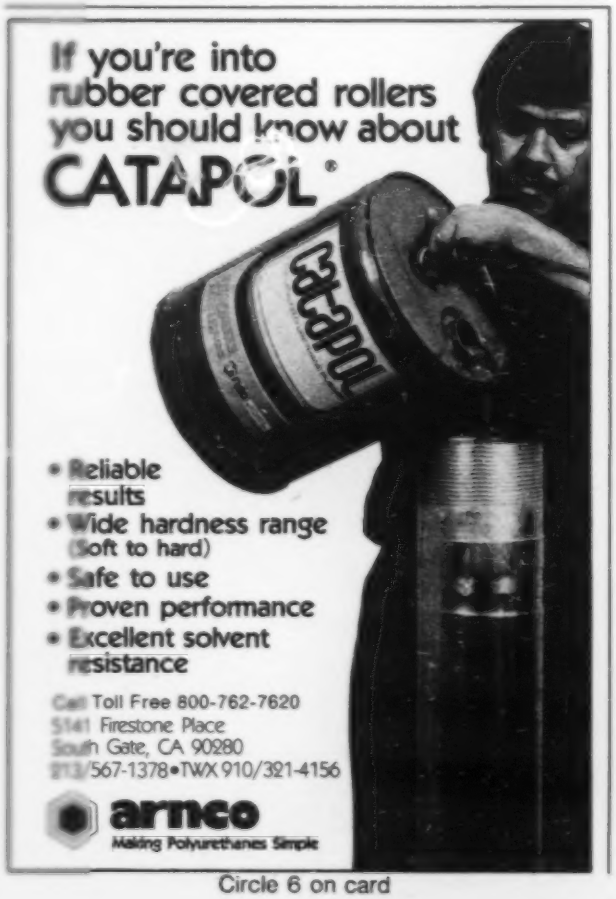
PMS Consolidated has added color concentrate production capability for molded and extruded thermoplastics at its Carolina, Pureto Rico plant.

Rexnord purchased the assets of **Canadian Adhesives, Ltd.** with manufacturing facilities in Montreal and Brampton, Ontario. Rexnord also opened a west coast warehouse and distribution center in Hayward, CA for its Sonneborn Building Products operation.

The Amark Co., Merrimack, NJ has been formed to sell and service capital equipment to the rubber and plastics industries.

RMA industry rubber report through August 1984 (figures are expressed in metric tons)

	Cumulative 1984	Cumulative 1983	% Change 84 vs 83
Total New Rubber			
New rubber available	2,137,971	1,802,949	18.58
Imports	701,466	550,542	27.41
Exports	257,730	206,825	24.61
Apparent Consumption	1,854,543	1,603,263	15.67
Total Natural Rubber			
Imports	540,566	438,880	23.18
Exports	19,351	11,807	63.89
Apparent Consumption	519,260	431,540	20.33
% Total new rubber	28.00	26.91	
Total Synthetic Rubber			
Production	1,436,505	1,252,407	14.70
Imports	160,900	111,682	44.07
Exports	238,379	195,018	22.23
Apparent Consumption	1,335,262	1,171,722	13.96
% Total new rubber	71.99	73.08	
Total SBR			
Production	650,785	587,138	10.84
Imports	48,837	37,420	30.51
Exports	72,956	54,959	32.75
Apparent Consumption	614,805	580,739	5.87
Total Nitrile			
Production	43,692	35,048	24.66
Imports	7,935	6,068	30.77
Exports	5,346	4,179	27.93
Apparent Consumption	44,397	36,614	21.26
Polybutadiene			
Production	247,460	209,998	17.84
Imports	44,659	27,890	60.13
Exports	15,699	10,612	47.94
Apparent Consumption	274,140	223,445	22.69
Ethylene-Propylene			
Production	149,446	111,138	34.47
Imports	700	380	84.21
Exports	24,077	20,839	15.54
Apparent Consumption	117,030	89,078	33.38
Butyl, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	259,545	232,483	11.64
Imports	55,768	37,401	49.11
Exports	93,293	74,818	24.69
Apparent Consumption	223,321	187,949	18.82
Polychloroprene			
Production	85,576	76,603	11.71
Imports	3,001	2,523	18.95
Exports	27,008	29,611	–8.79
Consumption	61,567	53,899	14.23



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RMA monthly tire & tube shipments & production report through August 1984
(figures in thousands of units)

Passenger Tires	**1984**	**1983**	**% Change**
Shipments			
Original Equipment	34,311	26,909	+27.52
Radial	28,841	22,428	+27.70
Replacement	96,881	90,444	+6.90
Radial	73,440	62,327	+17.83
Export	4,042	2,512	+60.91
Radial	3,000	1,689	+77.62
Total	135,034	119,862	+12.66
Radial	105,081	86,444	+21.56
Production	116,222	103,456	+12.34
Radial	87,280	72,060	+21.10
Truck & Bus Tires			
Shipments			
Original Equipment	5,269	3,352	+57.19
Radial	2,713	1,525	+77.90
Replacement	20,814	19,014	+9.47
Radial	7,185	6,128	+17.26
Export	882	666	+32.43
Radial	418	323	+29.41
Total	26,965	23,032	+17.06
Radial	10,316	7,976	+29.34
Production	24,366	19,754	+23.30
Radial	9,353	6,030	+55.11

Financial statements

American Biltrite reported third quarter earnings were $1.06 million on sales of $22.7 million.

Armstrong Rubber reported 1984 net income was a record $25.4 million and net sales were $665.6 million.

The Biltrite Corp. reported a net loss for the third quarter of $8.01 million on sales of $12.1 million.

Cabot Corp. reported 1984 net income was $97 million and net sales were $1.7 billion.

Carlisle Corp. reported third quarter net earnings of $8.5 million on sales of $138.7 million.

Crompton & Knowles Corp. had sales of $55.1 million and net earnings of $1.7 million.

Myers Industries reported third quarter earnings were $1.03 million on sales of $21.3 million.

Park-Ohio reported third quarter net income of $2.29 million with sales of $47.3 million.

Markets, news

The demand for tires in the United States may decline in the next five years Rubber Manufacturers Association president Donald Brotzman told the group's annual meeting. He said product performance would be the primary reason for the flattening out or slight decline. The RMA forecasts show increases for industrial products and molded, extruded and lathe-cut goods in the next five years around 3% annually.

Preliminary findings of a study by Landell Mills Commodities Studies show continued hard times for producers of emulsion styrene-butadiene rubber. Citing a present over capacity caused by a switch to other rubbers in the carcass of a tire and aggressive exporting by developing countries as two sources for SBR producer's problems. The study says SBR producers that have the capacity to produce solution polymers, whether polybutadiene, solution SBR o r polyisoprene can benefit from the changing requirements of their tire customers.

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Tadros: Effects of Polymers on Dispersion Properties—Based on the proceedings of an International Symposium of the Colloid and Surface Chemistry Group of the Society for Chemical Industry held at University College, London, England, from September 21-23, 1981. 418 pages.

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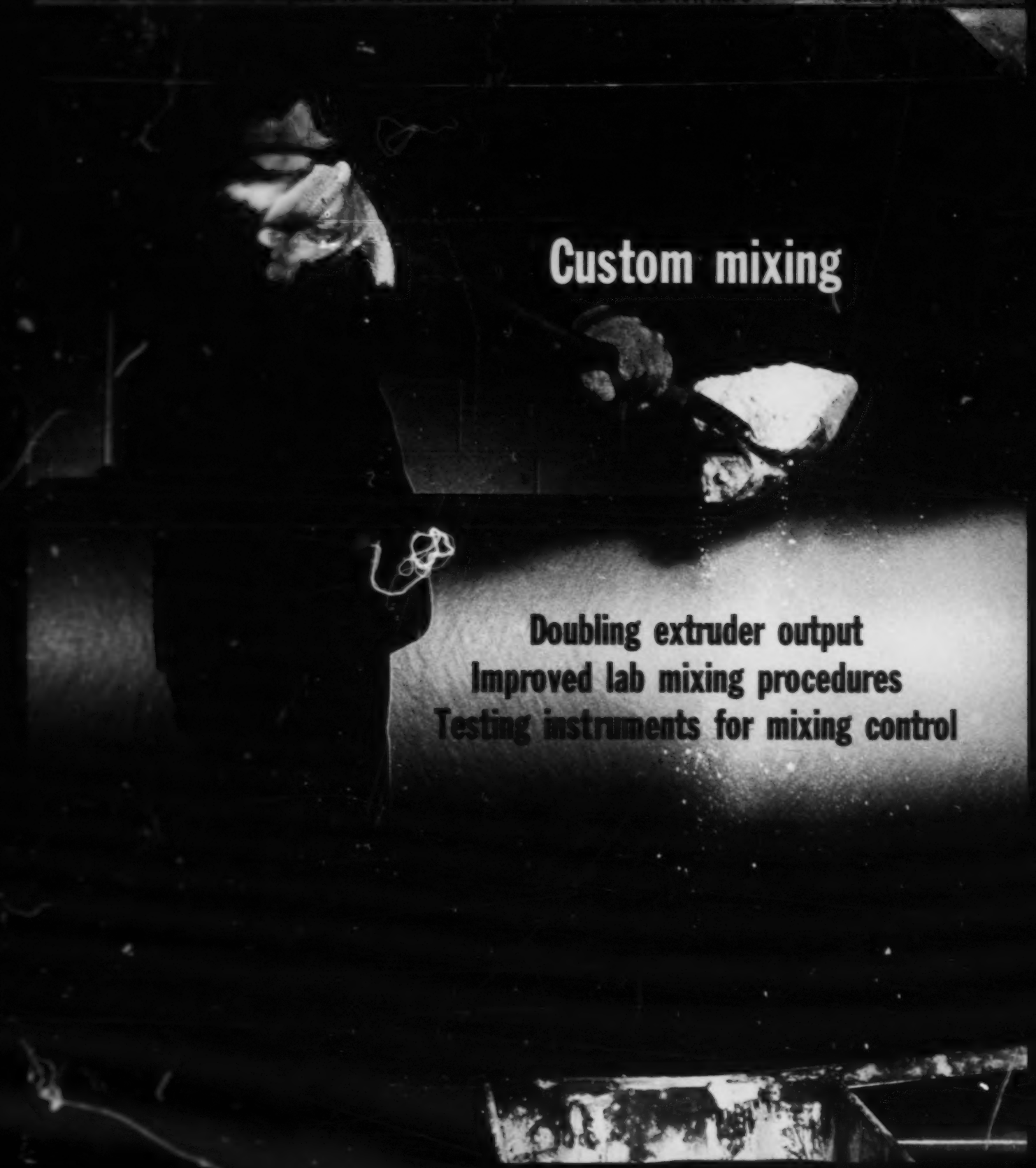


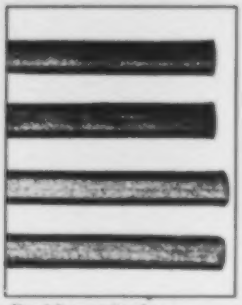
Custom mixing

Doubling extruder output
Improved lab mixing procedures
Testing instruments for mixing control

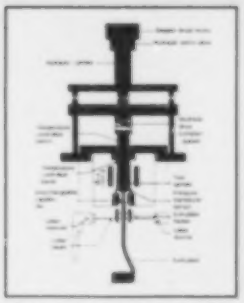
Contents

Vol. 181, No. 5/February 1980

Custom mixing p. 17



Doubling extruder output p. 24



Testing instruments p. 35

6 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

11 Tech Service: Molding — a few considerations
by Jon Menough, contributing technical services editor. Even the simplest molding operation is complex. Author looks at what is actually happening in the process and what the material is intended to do.

18 Custom mixers anticipating growth
A *Rubber World* survey shows that custom mixers have increased capacities over the last two years waiting for increased activity. Other results are given followed by a directory of custom services to the rubber industry.

24 How to double rubber extruder output
by Ron S. Hindmarch, Rubber and Plastics Research Association. Author looks at a way to speed up the extrusion process by fitting a Cavity Transfer Mixer to the head of an extruder.

30 Improved mixing procedures in the laboratory
by Herbert L. Brantley, Jr., Firestone Tire. Author discusses how a mixing procedure based on the power profile gives a more uniform mix quality than one based on temperature.

35 Improved mixing control — The role of testing instruments
by Joseph A. Jerdonek, Monsanto Co. A look at how the rubber compounder should approach testing improvements considering the limits of technology, people and financial resources.

40 Patent news
edited by Bob Samples, Akron Rubber Development.

49 Technical Focus — Automated control of plants and laboratories
by David Given, technical editor. A look at some new innovations in control of the manufacturing process and testing.

52 Techno Mart
New CAD/CAM, instruments, products, materials and equipment.

Departments

4	Editorial	47	Calendar	62	Literature
45	Meetings	59	Jobs & People	64	Ad Index

Cover

Cover photo courtesy of Central Rubber Co.

A Lippincott & Peto Publication

Business Briefs

Acquisitions, expansions

Polysar has completed the first step in a three-part program to improve product quality and increase plant capacity at its ethylene-propylene rubber facility in Orange, TX. Additional modifications will be undertaken during the next two years which will boost capacity to 75 million pounds a year. Cost is estimated at $4-5 million.

Uniroyal sold its Malaysian natural rubber plantation company to **Kumpulan Guthrie, Sdn. Bhd.** for $71 million plus additional amounts to be paid within four years. The sale was caused by the Malaysian government's policy requiring Malaysians to have majority control of rubber plantation businesses. Uniroyal's Malaysian plantations produced approximately 32 million pounds of natural rubber annually.

Hoover-Hanes Rubber Corp., Tallapoosa, GA, completed its latest plant expansion which includes a 42,000 sq. ft. building increasing capacity by 70% for rubber mixing.

Astro Molding, Old Bridge, NJ is undergoing expansion of its rubber and silicone molding operation that will double production capacity upon completion.

SCM Corp. has initiated a $30 million modification program of the titanium dioxide manufacturing complex at Stallingborough, England that will increase overall capacity to 105,000 metric tons per year.

Imperial Chemical Industries Plc. agreed to purchase the chemical operations of **Beatrice Companies** for $750 million.

Seal Master Corp., Kent, OH purchased a 30,000 sq. ft. building adjacent to its present location that will double production capacity for its inflatable rubber seals.

Lancer Dispersions, Akron, OH doubled its manufacturing capacity for pigment color dispersions in thermoplastic resin systems by moving to a larger facility.

General Tire reopened its Brittain warehouse operation in Akron, OH which was closed in 1983 after General's Akron tire manufacturing plant shutdown. Initially only about one-third of the 664,000 sq. ft. of space will be utilized.

BFGoodrich has agreed to purchase the operating assets of **Sargent Industries'** PICO Division. PICO manufactures and services emergency evacuation systems for aircraft with manufacturing facility in Los Angeles and four service centers.

Alco Chemical, Chattanooga, TN expanded its spray

RMA industry rubber report through September 1984 (figures are expressed in metric tons)

	Cumulative 1984	Cumulative 1983	% Change 84 vs 83
Total New Rubber			
New rubber available	2,400,133	2,029,085	18.32
Imports	791,312	617,076	28.24
Exports	292,668	233,162	25.52
Apparent Consumption	2,059,834	1,824,009	13.46
Total Natural Rubber			
Imports	603,135	483,795	25.91
Exports	22,802	13,764	65.66
Apparent Consumption	582,750	481,750	21.00
% Total new rubber	28.16	26.41	
Total Synthetic Rubber			
Production	1,609,521	1,412,009	13.99
Imports	182,177	133,281	36.69
Exports	269,866	219,398	23.00
Apparent Consumption	1,486,908	1,342,259	10.78
% Total new rubber	71.83	73.58	
Total SBR			
Production	732,703	661,744	10.72
Imports	54,875	44,357	23.71
Exports	81,721	62,894	29.93
Apparent Consumption	686,507	659,939	4.03
Total Nitrile			
Production	49,336	39,599	24.59
Imports	8,686	6,960	24.7
Exports	5,896	4,747	24.20
Apparent Consumption	49,851	42,369	11.99
Polybutadiene			
Production	274,228	238,088	15.18
Imports	51,052	33,670	51.62
Exports	17,499	12,348	41.72
Apparent Consumption	307,654	258,205	20.09
Ethylene-Propylene			
Production	169,084	127,724	32.38
Imports	738	515	43.30
Exports	27,083	23,288	16.30
Apparent Consumption	130,611	104,769	24.66
Butyl, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	285,277	262,128	8.83
Imports	63,186	43,298	45.94
Exports	107,010	84,753	26.26
Apparent Consumption	241,778	216,582	11.65
Polychloroprene			
Production	76,893	62,729	19.54
Imports	3,640	4,478	-18.71
Exports	30,657	31,368	-2.27
Consumption	70,307	62,426	12.62

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Reeve Electronics, manufacturers of induction, dielectric and industrial microwave heating equipment has been acquired by **Mellish & Murray**, Chicago, IL.

Itaco, USA, a privately held California based company bought **McNeil Akron, Inc.** a manufacturer of tire, rubber and plastics equipment. Itaco's parent company, Itaco Holdings owns, Repiquet, a European manufacturer of equipment for the tire, rubber and plastics industries.

Contracts, licenses

Zwick GmbH, Ulm, West Germany has formed Zwick of America in East Windsor, CT to operate as the exclusive sales and service distributor for Zwick's materials testing machines and instruments.

Baychem Inc., Kennesaw, GA was appointed by **Glyco Inc.** as a distributor of its specialty chemicals in Georgia, Alabama and northern Florida. Glyco appointed **Worth Chemical Corp.**, Greensboro, NC as distributor in the Carolinas, Virginia and eastern Tennessee.

Financial statements

Blasius Industries reported second quarter net earnings of $918,000 on net sales of $11.4 million.

Cabot Corp. reported net sales for 1984 were $1.75 billion and operating profit was $213.3 million.

Price changes

Goodyear raised the price of its Plioflex styrene butadiene rubber by 2¢ per pound.

Union Carbide increased the prices of certain carbon fiber products produced from rayon and palyacrylonitrile based precursors. Grades T-300 6K, T-500 6K, T-300 12K, and T-500 12K prices increase 11.5% to 17% depending on the filament count.

Akzo Chemie America-Noury Chemicals reduced prices on the following organic peroxides. New prices for 2,000 lb. quantities are: 2-ethyl hexyl peroxydicarbonate- $3/lb.; sec-butyl peroxydicarbonate- $4.60/lb.; t-butyl peroxyneodecanoate- $3.62/lb.; cumyl peroxydeodecanoate- $4.61/lb.; t-butyl perpivalate-$3.10/lb. Also reduced are Cadox TX-50 silicone paste now at $12/lb. in over 500 lb. quantities and Trigonox 17/40 at $3.80/lb. in similar quantities.

Markets, news

Although the final figures for 1984 will not be available for several weeks, it appears that rubber consumption in North America grew substantially during the year compared to 1983 according to the International Institute of Synthetic Rubber Producers. IISRP figures show 1984

RMA tire & tube report through September 1984
(figures in thousands of units)

Passenger Tires	1984	1983	% Change
Shipments			
Original Equipment	28,160	31,590	+21.63
Radial	31,925	26,160	+21.90
Replacement	108,440	103,034	+6.22
Radial	83,059	71,185	+16.66
Export	4,462	2,939	+52.50
Radial	3,336	1,960	+67.64
Total	152,090	137,363	+10.73
Radial	118,320	99,305	+19.08
Production	130,563	117,057	+11.54
Radial	98,409	81,722	+20.49
Truck & Bus Tires			
Shipments			
Original Equipment	5,905	3,881	+52.15
Radial	3,047	1,771	+72.05
Replacement	23,528	22,141	+6.26
Radial	8,185	7,229	+13.22
Export	1,002	765	+30.98
Radial	462	366	+26.23
Total	30,435	26,787	+13.62
Radial	11,694	9,366	+24.86
Production	27,349	22,513	+21.46
Radial	10,422	6,903	+50.98

IISRP North American new rubber consumption forecast
(All figures in m metric tons)

	1983 (Actual)	1984	1985	1989
Styrene butadiene — dry	873	930	929	969
Styrene butadiene — latex	104	107	108	114
Polybutadiene	386	430	433	464
Ethylene/propylene	148	184	193	227
Nitrile — solid	53	63	65	71
Nitrile — latex	7	7	7	9
Polychloroprene	89	95	97	104
Other synthetic (1)	352	393	404	431
Total synthetic	2,012	2,209	2,236	2,389
Natural rubber	760	839	834	876
Total new rubber	2,772	3,048	3,070	3,265
% synthetic	72.6	72.5	72.8	73.2
Tire rubber	1,701	1,855	1,860	1,932
Non tire rubber	1,071	1,193	1,210	1,333
Carboxylated SBR latex	337	359	367	403

(1) Includes butyl and polyisoprene

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IISRP Western Europe new rubber consumption forecast
(All figures in m metric tons)

	1983 (Actual)	1984	1985	1989
Styrene butadiene — dry	594	603	615	649
Styrene butadiene — latex	109	109	110	112
Polybutadiene	222	232	237	260
Ethylene/propylene	133	140	146	165
Nitrile — solid & latex	73	77	78	80
Polychloroprene	81	80	79	77
Other synthetic (1)	192	200	208	237
Total synthetic	1,404	1,441	1,473	1,580
Natural rubber	826	840	850	890
Total new rubber	2,230	2,281	2,323	2,470
% synthetic	63.0	63.2	63.4	64.0
Carboxylated SBR latex	255	273	275	290

(1) Includes butyl and polyisoprene

consumption increased by an estimated 10%, but this level is still lower than 1979, the year of record rubber consumption. IISRP projections of rubber demand through 1989 show a compounded annual growth rate of 1.4%. Because of the development of longer wearing and smaller tires, the proportion of total rubber used in tires is projected to decline from 60.9% in 1984 to 59.2% in 1989. Synthetic rubber is expected to increase from 72.5% to 73.2% of total rubber consumer during the same time frame. The strongest growth segment is expected to be in ethylene-propylene rubbers. A major portion of this strength is expected in non-tire applications (4.3% per year).

The IISRP said synthetic rubber consumption increased 3.2% in western Europe in 1984 despite the reduction in automotive production in West Germany, France and the U.K. The long term forecast projects a growth rate of 1.8%. The general purpose rubber are expected to grow at levels below the estimates for industrial production due to the continued downsizing trend in car tires. However, some SBR substitution by polybutadiene rubber in tires is forecast providing a growth rate equal to assumed car production growth rates for polybutadiene. EPDM is forecast to grow at the rate of 3.3% throughout the forecast period. Growth in specialty elastomers is estimated to be approximately 6% per annum.

Goodyear and Firestone have both released their projections for tire sales in 1985. Goodyear says demand will be 50 million original equipment tires, 138 million replacements, 2.2 million oe truck tires and 5.6 million truck replacement radials. Goodyear said imports took 21% of the total replacement tire market and 26% of the radial market. The company said the U.S. tire industry operated at well over 90% capacity in 1984.

Firestone sees 51 million oe tires sold, 138 million replacements, and total truck tire sales of 39 million units with oe accounting for 7 million units. Tractor and farm implement shipments should be around 3.5 million units.

Goodyear says that 1985 should see a record year in U.S. retail sales of replacement belts and hoses. The industry should reach $1.03 billion in retail sales. V belts and hose will lead the way in the auto aftermarket with forecasted increase of over 6% over 1984's performance.

BFGoodrich will phase out the manufacturing of industrial rubber products in Akron by the end of the first quarter of 1986 affecting 950 hourly and salaried people.

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Custom mixers anticipating growth

With two years of capacity expansion programs behind them, most custom mixers are looking forward to utilizing this added capacity in 1985. A recent *Rubber World* survey shows that capacity expansion among the custom mixers slowed in 1984 compared to 1983 and that most mixers weren't planning expansions for this year. "We have put in place enough capacity to last us for quite a while" one mixer said and the survey results bear this out.

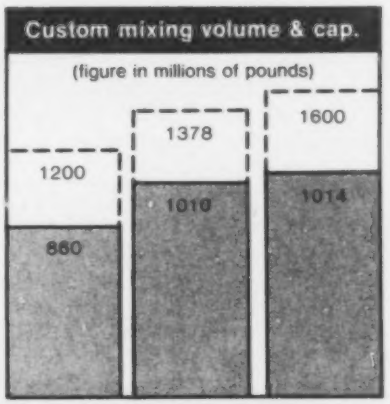
The survey shows the custom mixing segment of the rubber industry operated at 60% capacity in 1984 a drop from the 70% reported last year and lower than the 62.4% reported in 1982. The drop is a result in the addition of capacity because actual pounds mixed increased slightly from just over one billion pounds in 1983 to an estimated 1.014 in 1984. The estimated volume for 1982 was 860 million pounds.

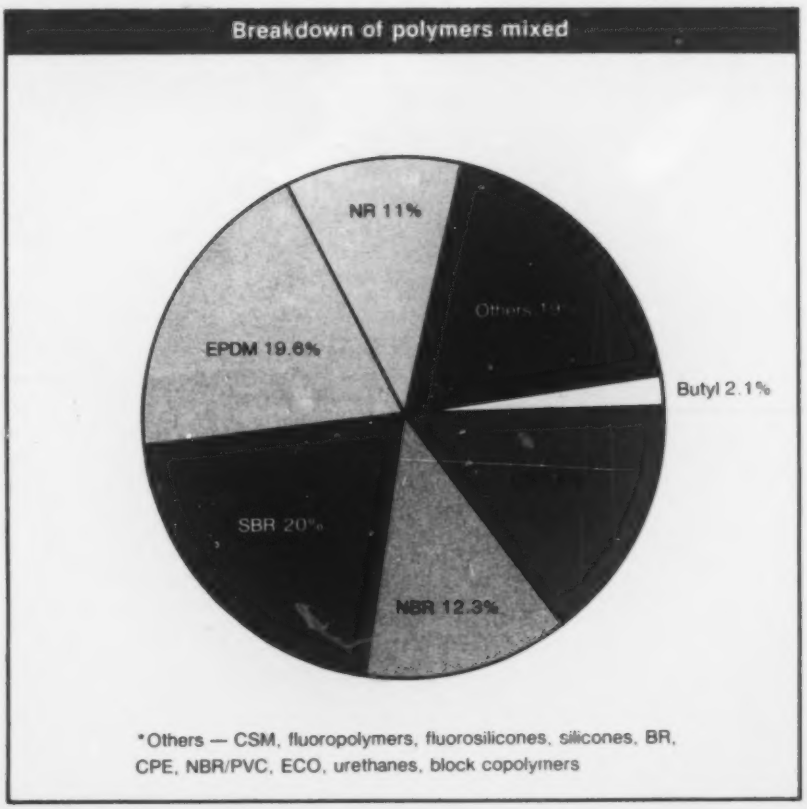
Expansion has been put on hold for 1985 as only 16% of the mixers indicated they would add to capacity this year while 41% indicated last year they were planning expansions. Some actually didn't go through with expansion programs as only 25% of the companies expanded in 1984. While companies didn't increase mixing capacity, many added to the services they provide. Calendering is now offered by 55% of the custom mixers whereas only one third reported that service a year ago. Some mixers have added custom extrusions to their business as well.

Some of the expansions that did take place in 1984 were Long Mile's expansion of facilities adjacent to its Dallas, TX operation, J-Sil added 12,000 sq. ft. to its Brimfield, IN facility and Ristance Compounds tripled its mixing capacity for silicones at Mishawaka, IN. Also in 1984, Quabaug Rubber entered the custom mixing business by establishing a separate operating unit with the capability to mix most polymers.

Most of the mixers offer the capability to mix most polymers with some specializing only in specialty elastomers like thermoplastics and fluoroelastomers. Some do strictly silicone mixing. (See accompanying directory for individual company capabilities.)

Styrene butadiene rubber was indicated as the rubber mixed the most often, capturing almost 20% of the market. SBR was followed by ethylene propylene rubbers at 19.6%, chloroprenes at 16%, NBR at 12.3% and natural rubber close to 11%. The survey shows actually a slight drop in EPDM mixing with almost 200 million pounds mixed in 1984 compared to 224 million in 1983. SBR increased from 193 million in 1983 to 202.4 million in 1984 and CR slid from 191 million to 163 million. A big gain was recorded in the so-called other category from 160 million to 192 million. This category consists of fluoroelastomers, silicones, CSM, fluoropolymers, BR, CPE, NBR/PVC, ECO urethanes and block copolymers.





Custom mixers

The following directory lists the custom mixers along with plant locations, equipment, mixing capabilities and capacity. A map showing locations appears on pages 18 and 19.

Adcoat Inc.
172 E. La Jolla St.
Placentia, CA 92670
(714) 630-7311
Hugh Muller
President
Sheldon Weinstein
Vice President
James Troska
Research and Development
Equipment: 5 high speed dispersion mixers, 10 low speed mixers
Mixing capabilities: all solvent soluble resins and polymers
Capacity: 2 million gals./year

Alloy Polymers, an Inco Co.
145 Hopper Ave.
Waldwick, NJ 07463
(201) 447-6172
Branch
Alloy Polymers
3155 W. Big Beaver Road
(Suite 205)
Troy, MI 48084
(313) 626-5162
S. Pahuja
Gen. Mgr.
Equipment: 2 lines-Werner & Pfleiderer Twin Screw High Intensity Mixers
Mixing capabilities: Specialize in engineering polymers
Capacity: 10 million lbs/year

Associated Rubber Co.
Spring St.
P.O. Box 245
Tallapoosa, GA 30176
(404) 574-2321
Glenn Stephens
General Manager
Equipment: 3 #11 Banburies
Mixing capabilities: SBR, NR, NBR, CR, ECO, CSM, EPDM, IIR, CIIR, Fluoroelastomers
Capacity: 90 million lbs/year

Avon Custom Mixing Services
Division Chase & Sons Inc.
55 High St.
Holbrook, MA 02343
(617) 767-0511
Anthony Chiulli
Operations Manager
Mark F. Chase
Factory Manager
Frank B. Smith
Sales Manager
Equipment: 2 #11 Banburies, #3 Banbury, 8 mills (84", 60", 48"), 6 calenders
Mixing capabilities: all elastomers including silicone
Capacity: 10 million lbs/year

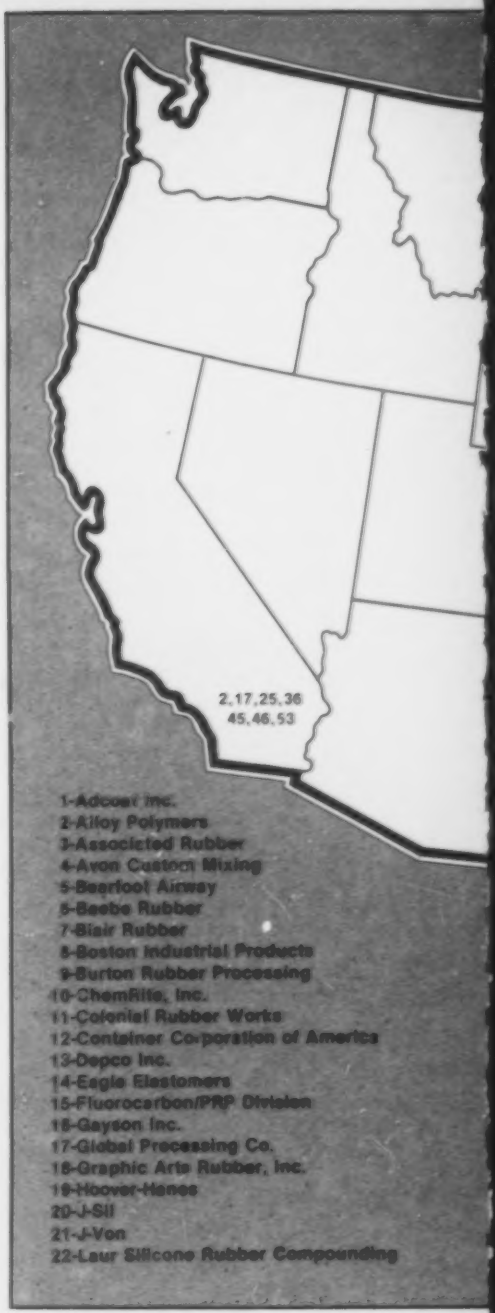
Bearfoot Airway Division
Bearfoot Corp.
First & Water Sts.
Wadsworth, OH 44281
(216) 335-2581
W.O. Stoufer
General Sales Mfg.
District Sales Office
Bob Kross
404 Northland Towers W.
15565 Northland Dr.
Southland, MI 48075
Equipment: 3 #11 Banburies (1 pelletizer), 3 calenders, 4-84" mills, 3-60" mills, 2 tubers, Cameron 56" slitter
Mixing capabilities: SBR, NBR, CR, BR, IIR, NR, Non-black, Adhesives, specialize in butyl mixing
Capacity: 20 to 25 million lbs/year

Beebe Rubber Co.
20 Marshall St.
Nashua, NJ 03061
(603) 883-5576
Equipment: #3A Banbury, 2 #11 Banburies, 5 mills (60 to 84")
Mixing capabilities: NR, CR, IIR, SBR, NBR, CSM, Polysulfide, all others except silicone
Capacity: 90 million lbs/year

Blair Rubber Company
1252 Mina Ave.
Akron, OH 44321
(216) 666-3600
Tom Blair
President
A.W. Giles
Sales Custom Mixing
Equipment: internal mixer and open mill
Mixing capabilities: natural, nitrile, EPDM, Neoprene, chlorobutyl, butyl, hypalon, SBR
Capacity: Not available

Boston Industrial Products
Div. Dana Corp.
Hwy. 77 East
P.O. Box 38
Newbern, TN 38059
(901) 627-2531
Dale Meyring
Customer Service Manager
Equipment: F270 Banbury
Mixing capabilities: NR, EPDM, SBR, NBR, CR, CSM, ECO, BR
Capacity: 30 million lbs/year

Burton Rubber Processing Inc.
14330 Kinsman Rd.
Burton, OH 44021
(216) 834-4644
David W. Mohr
VP Sales
Branch
P.O. Box 377
Highway 34
Jonesboro, TN 37659
Equipment: 2 #11D Banburies, F270 Banbury, F370 Banbury, 4-60" mills
Mixing capabilities: all synthetic and natural rubber excluding latex, silicones and fluoroelastomers, alloys of plastics/rubber and color concentrates, PVC/NBR blends
Capacity: 50 to 80 million lbs/year



ChemRite, Inc.
P.O. Box 1052
149 King St.
W. Hanover, MA 02339
(617) 878-5300
Dick Mastromatteo
Owner
Ernest Morrisey
General Manager

Equipment: 2 #3A Banburies, 3-60" mills, 84" mills, 8½" extruder/strainer, 3 refiners

Mixing capabilities: fluoropolymers and fluorosilicones
Capacity: 2 million lbs/year

Colonial Rubber Works
150 South Connell Ave.
Dyersburg, TN 38024
(901) 285-4353
Jim Carver
VP Sales
Branch
P.O. Box 640
Kingstree, SC 29556
Equipment: 2 #27 Banburies, 3 #12 Stewart Bolling, 6 #10 Stewart Bolling, 4 calenders (3-60", 1-66")
Mixing capabilities: thermoset and thermoplastic
Capacity: 300 million lbs/year

Container Corporation of America
Heisler Compounding Division
P.O. Box 1648
1204 E. 12th Street
Wilmington, DE 19898
(302) 573-2550
Doug Brown
Gen. Mgr.
Equipment: 2 #4 Stewart Bolling, #10 Stewart Bolling, 6" cold feed extruder with each mixer
Mixing capabilities: Plastic resins, IIR, EPDM, EPR, NBR, SBR, general polyolefins, non-black
Capacity: 70 million lbs/year

Depco Inc.
36 Grand Blvd.
Brentwood, NY 11717
(516) 231-1610
David Bean
President
Equipment: 2 mills (40" and 45")
Mixing capabilities: exclusively silicone
Capacity: One million lbs/year

Eagle Elastomers
4646 Darrow Rd.
Stow, OH 44224
(216) 688-7070
Neil McHale

Director of Sales
Equipment: 36" special mill, 60" calender, 2½" extruder
Mixing capabilities: fluoroelastomers and fluorosilicones
Capacity: 1.25 million lbs/year

Fluorocarbon/PRP Division
10420 Old Katy Road
P.O. Box 3402
Houston, TX 77253
(713) 467-9111
Charles E. White
Chief Chemist
Equipment: Banbury (internal) and open mill
Mixing capabilities: all kinds
Capacity: 15,000 lbs/day

Gayson Inc.
P.O. Box 222
Ringwood, NJ 07456
(201) 728-8100
L. Raymond Olson
President
Equipment: Banbury, 2 2-roll mills, 3 3-roll mills
Mixing capabilities: silicone, specialty colors
Capacity: not available

Global Processing Co.
11831 Wakeman St.
Santa Fe Springs, CA 90670
(213) 945-1241
Fred Williams
President
Equipment: #4 Banbury, 2 mills (60" & 50")
Mixing capabilities: All types except silicone, specialize in fluoroelastomers
Capacity: 5 million lbs/year

Graphic Arts Rubber, Inc.
467 Dan Street
Akron, OH 44310
(216) 253-0731
Jim Bedell
Sales Manager
Equipment: 3-60" mills
Mixing capabilities: all-no free black
Capacity: Two million lbs/year

Hoover-Hanes
Pequanoc Dr.
Tallapoosa, GA 30176
(404) 574-2341
Jack Williams
VP & Gen. Mgr.
Equipment: #11 Banbury, #9 Banbury, 84" mill, 100" mill
Mixing capabilities: all grades of soft and hard rubber
Capacity: 50 million lbs/year

J-Sil
1400 North Bowie Drive
Weatherford, TX 76086
(817) 594-0263
Gary Mellema
Marketing Manager
Branch
J-Sil East
169A Progress Dr.
Manchester, CT 06040
(203) 761-5509
J-Sil Midwest
U.S. 6 West, P.O. Box 845
Kendallville, IN 46755
(219) 347-5813
Equipment: 8 Domixers varying from 180 gallon to 600 gallon; 2 Banbury mixers (3A & 11); 12 mills (40", 60", 84")
Mixing capabilities: silicone and fluorosilicone
Capacity: 20 million lbs/year

J-Von
Division of Jones & Vining
25 Litchfield St.
Leominister, MA 01453
(617) 537-4721
Victor E. Nunan
VP & Gen. Mgr.
Equipment: 2½" single screw extruder, 4½" single screw extruder, 67mm twin screw extruder, 110mm twin screw extruder
Mixing capabilities: styrenic block copolymers, thermoplastic elastomers
Capacity: 12 million lbs/year

Laur Silicone Rubber Compounding, Inc.
4930 S. M-18
P.O. Box 509
Beaverton, MI 48612
(517) 435-7706
Don Laur — VP
Equipment: 24" mill, 60" mill, 10 gal & 150 gal double arm mixers, preforming strainers
Mixing capabilities: exclusively silicone
Capacity: One million lbs/year

Long Mile Rubber — Flexmix Div.
5550 LBJ Freeway
Suite 200
Dallas, TX 75240
(214) 350-7851
Jerry Strigle
Director Custom Mixing
Equipment: #4 Banbury + 6" extruder, #9 Banbury, 2 #11 Banburies, 2-260A Skinners, 60" mill, 3-8" hot-feed extruders, 2-10"extruders
Capacity: Not available

Mach-1 Compounding
Division of Burton Rubber Processing Inc.
775 E. Highland Rd.
Macedonia, OH 44056
(216) 467-8109
Edward M. Echan
General Manager
Equipment: #3D Banbury, Henschel, ribbon blender, FCM
Mixing capabilities: thermoplastic, thermoset, thermoplastic elastomer, alloys
Capacity: 12 million lbs/year

Master Processing Corp.
2500 Thompson St.
P.O. Box 740
Long Beach, CA 90801
(213) 531-3880
L.G. Parasson
Sales & Marketing
Branch
Muscatine, IA
(319) 262-2505
Equipment: #11 Banbury, 3 #12 Stewart Bolling, #10 Stewart Bolling, 3-66" calendars, 60" calender, 7 mills (60", 66", 84")
Mixing capabilities: all of the solids
Capacity: 125 million lbs/year

Midwest Rubber Reclaiming Co.
745 Norton Ave.
P.O. Box 270
Barberton, OH 44203
(216) 753-5056
Harold Jessop
General Manager
Equipment: #11 Banbury, Shaw K-7, #12 Stewart Bolling
Mixing capabilities: standard types
Capacity: 60 million lbs/year

H. Muehlstein & Co., Inc.
3296 W. Market St.
P.O. Box 5402
Akron, OH 44313
(216) 836-9131
H.L. Gaynor
VP
Equipment: #27 Banbury
Mixing capabilities: complete master-batch mixing services
Capacity: 12 million lbs/year

Paeco Rubber Co.
225 W. Lake St.
P.O. Box 472
(216) 673-4100
W.H. Phillips
Treasurer
Equipment: #10 Stewart Bolling
Mixing capabilities: all except Viton or silicone
Capacity: 20 million lbs/year

Passaic Rubber Co.
45 Demerest Dr.
P.O. Box 505
Wayne, NJ 07450
(201) 696-9500
John Mathey
Equipment: #4 Stewart Bolling, 5 mills (60" to 84"), 2-54" calenders, 4" extruder
Mixing capabilities: all polymers except Thiokol
Capacity: 3 million lbs/year

Pelmor Laboratories Inc.
401 Lafayette St.
P.O. Box 309
Newtown, PA 18940
(215) 968-3334
Bruce G. Pelham
VP Sales
Equipment: #1B Banbury, 3 mills (18", 40", 60")
Mixing capabilities: generally all types, specializing in Viton
Capacity: 750,000 lbs/year

Pilgrim Custom Mixing Corp.
84 Water St.
P.O. Box 2573
Fall River, MA 02722
(617) 675-0181
Arthur P. Reis
Gen. Mgr.
Equipment: 3 #11 Banburies, 2-60" mills, 3-84" mills
Mixing capabilities: all general purpose polymers
Capacity: 13 million lbs/year

Polymerics, Inc.
2828 Second St.
Cuyahoga Falls, OH 44221
(216) 928-2210
Dave Topliff
General Mgr.
Equipment: #9 Banbury, 60" mill, 84" mill
Capacity: 12 million lbs/year

Polysar Rubber Services
Division of Polysar Inc.
2603 W. Market St.
Akron, OH 44313
(216) 836-0451
T.C. Green
Corporate Offices General Manager
R.W. Houkom
Marketing Manager
Regional Plant Locations:
Joe Falanga
Mfg. Mgr.
1020 Lambert St.
Barberton, OH 44203
(216) 745-1184
Colonial Oaks Ind. Park
P.O. Box 327
East Brunswick, NJ 08816
(201) 257-9600
Charles McKeag
Site Manager
1038 Evans Ave.
Akron, OH 44305
(216) 630-9460
Equipment: 2 #4 Banburies, 2 #11 Banburies, #12 Banbury, 2 F270 Banburies
Mixing capabilities: most organic rubbers and thermoplastics, silicone, separate black and non-black facilities
Capacity: approx. 100 million lbs/year

Prolastomer Inc.
56 Eagle Street
P.O. Box 2068
Waterbury, CT 06708
(203) 755-5755
Dennis J. Synnott
Technical Director
Equipment: Banbury, Mill, Extrusion, Underwater pelletizer
Mixing capabilities: thermoplastic elastomers
Capacity: Not available

Quabaug Custom Mixing
North Brookfield, MA 01535
(800) 325-5022,
in MA (617) 867-7731
Kevin Donahue
Equipment: 2 #11 Banburies; 1 #9 Banbury; 2 lab banburies
Mixing capabilities: SBR, neoprene, nitrile, butyl, EPDM, Hydrins
Capacity: 50 million lbs/year

R&S Processing Co., Inc.
15712 Illinois Ave.
P.O. Box 985
Paramount, CA 90723
(213) 531-1403
James Inga
President
Equipment: #9 Banbury (black), #4 Stewart Bolling (colors)
Mixing capabilities: NR, IR, SBR, IIR, EPDM, ECO, CR, Urethane, Polysulfide, Viton, NBR
Capacity: 18 million lbs/year

Rainbow Mastermixing Inc.
455 Dan St.
Akron, OH 44310
(216) 374-1810
Daniel R. Unk
President
Equipment: 60" rubber mills, granulators
Mixing capabilities: All. Specializing in colors and fluoroelastomers
Capacity: 1.7 million lbs

Rauh Rubber Inc.
986 E. Market St.
Akron, OH 44305
(216) 253-2549
(216) 253-5667
Joe Rauh
President
Equipment: #11 Banbury, 60" mill, 84" mill, Barwell extruder/preformer
Mixing capabilities: NR, SBR, EPDM, NBR, CR, EPR, IIR, ECO
Capacity: 20 million lbs/year

Ristance Compounds
14155 Esther Ave.
Mishawaka, IN 46545
(219) 259-9903
Equipment: mills
Mixing capabilities: silicone
Capacity: NA

Rubber Mixing Industries
1205 E. Bowman St.
Wooster, OH 44691
(216) 264-4091
E. David Gordon
Equipment: #3A Banbury, #11 Banbury, 68" 3-roll calender, 66" 3-roll calender, 66" 4-roll offset calender
Mixing capabilities: NBR, SBR, EPDM, CSM, CR, IIR, custom calendering
Capacity: 35-40 million lbs/year

S&D Rubber Co.
King Street
W. Hanover, MA 02339
(617) 878-2626
John P. Davis
Equipment: #3A Banbury, 3 #9 Banburies, 2 extruders (4" & 8"), 2 mills (60" & 84")
Mixing capabilities: all polymers
Capacity: 15 million lbs/year

Star-Glo Industries
2 Carlton Ave.
East Rutherford, NJ 07073
(201) 939-6162
Martin F. Sheridan
General Manager
Equipment: 2 #3A Banburies, 2-66" calenders
Mixing capabilities: NR, SBR, CIS-BR, NBR, CR, IIR, EPDM, CSM, ACM, Urethane, Norsorex, Fluoroelastomers, silicone
Capacity: 3 million lbs/year

Technical Rubber & Plastics Corp.
180 Getty Ave.
Clifton, NJ 07015
(201) 546-0700
Marc Witt
Vice President
Equipment: #3A Banbury
Mixing capabilities: SBR, NR, EPDM, CSM, CR, Viton, Silicone, Urethane, Polysulfide
Capacity: 20 million lbs/year

Uniroyal, Inc.
Custom Mixing Unit
312 North Hill Street
P.O. Box 2000
Mishawaka, IN 46544-1399
(219) 256-8528
A.L. Javis
Sales Manager
Equipment: Banbury, open mill and internal mixer
Mixing capabilities: all natural and synthetic
Capacity: 200 million lbs/year

Valley Processing
491 Wilson Way
Industry, CA 91744
(818) 961-0311
Bill Bryant
VP Sales
Equipment: #3A Banbury, 2 #11 Banburies, 68″ 4-roll calender
Mixing capabilities: SBR, CR, NBR, EPDM, IIR, NR, CSM, BR
Capacity: 50 million lbs/year

West American Rubber Co.
750 North Main St.
Orange, CA 92668
(714) 532-3355
Arun Shah
Vice President R&D
Equipment: #3A & #11 Banburies
Mixing capabilities: all solid polymers
Capacity: 24 million lbs/year

Custom Services

The following companies offer various custom services to the rubber industry. Locations, equipment and services offered are given. A map showing locations appears on pages 18 and 19.

Akron Dispersions, Inc.
3291 Sawmill Road
P.O. Box 4295
Akron, Ohio 44321
(216) 666-0045
Michael J. Giustino
General Manager
Jeanne Volk
Customer Service
Services offered: chemical grinding and blending, rubber grinding, DLCs, liquid blending

Baker Rubber, Inc.
P.O. Box 2438
South Bend, IN 46680
(219) 291-5101
R. Douglas Toler
Director of Marketing
Services offered: grinding of tires and other rubber products
Equipment: grinders and choppers; vibrating screens

Calendering Specialists, Inc.
1119 Commercial Blvd., South
Arlington, TX 76017
(817) 467-1200
Don Ripley
Vice President/Production Manager
Services offered: custom calendering
Equipment: calender, 66″ mills, slitters, dip tanks

Central Rubber Co.
844 E. Jackson St.
Belvidere, IL 61008
(815) 544-2191
Contact: Frank Bruno
(312) 272-7990
Services offered: custom molding of colored rubber
Equipment: mills
Mixing capabilities: NR, SBR, Neoprene, Hypalon nitrile EPDM silicone, butyl, urethane, Viton Thiokol

The Crislip Corporation
121 Factory Street
P.O. Box 4441
Creston, OH 44217
(216) 435-6881
D.E. Crislip Jr.
Vice President
Services offered: tank lining and tank lining applicator rubber
Equipment: mills, calenders, autoclaves, pressers, air compressors, steam tables, lathes

North American Reiss Corp.
Homestead Road
Belle Mead, NJ 08502
(201) 359-5100
Dennis Azzolina
General Manager
Services offered: silicone rubber compounds
Equipment: rubber mills and extruders for straining and preforming

Rubber/Urethanes, Inc.
968 W. Foothill Blvd.
Azusa, CA 91702
(818) 334-0281
Jerry Goens
Bernadette Battles
Services offered: precision metal to rubber bonded components and capstans for the computer and electronic industries
Equipment: autoclaves, coaters, cooling equipment, curling ovens, deflashing equipment, extruders, grinders, lathes, mills, mixers, plastic processing equipment, presses (compression, transfer, injection), punch presses, ribbon blenders, trimmers, urethane processing equipment (cast and spray)

Salem-Republic Rubber Company
P.O. Box 389
475 W. California Ave.
Sebring, OH 44672
1-800-221-5389
In Ohio, (216) 938-9301
A.V. Ney
President, Gen. Mgr.
Jim Willis
Customer Service Mgr.
Equipment: processing machinery and equipment, mills, extruders, calenders, cutting equipment, dryers, hose-making machinery, lathes, vulcanizers, autoclaves
Mixing capabilities: hand and machine-made hose, custom calendered uncured materials
Capacity: hose 1.5 million lbs/yr; custom calendered goods 500,000 lbs/yr

Sparton Enterprises, Inc.
3717 Clark Mill Road
Barberton, Ohio 44203
(216) 745-6088
Jim Little Jr.
VP/Sales
Equipment: grinders, granulators, sifters and sizing equipment
Mixing capabilities: Rubber grinding, granulating, recycling
Capacity: 30 million lbs/yr

Tooltec Inc.
2225 Meyer Road
Fort Wayne, IN 46803
(219) 426-4686
Karl Reuther II
President
Services offered: manufacturing of trimless rubber mold
Equipment: 2 CNC lathes, 1 CNC vertical machining center, 7 engine lathes, 4 Bridgeport mills, 2 radial drills, grinders

CS:175-1

Rubber World

The technical service magazine for the rubber industry

Volume 191, No. 6

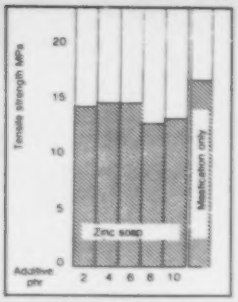
Natural rubber

Epoxidized NR
Controlling NR processability
Compounding ingredients price list
Truck tire requirements

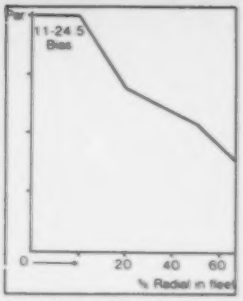
Contents

Vol. 191, No. 6/March 1985

Natural rubber p. 15



NR processability p. 21



Truck tire requirements p. 26

7 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

12 Tech Service: ENR — a new breed
by Jon Monough, contributing technical services editor. ENR is formed by adding epoxide groups to the backbone of the natural rubber molecule. Author looks at how ENR is compounded, its benefits and its uses.

15 Epoxidized natural rubber — a new synthetic polymer?
by Crispin S.L. Baker and Ian R. Gelling, The Malaysian Rubber Producers' Research Association. Authors look at ENR, natural rubber epoxidized at the latex stage, and regard it as a new polymer, since in some properties it more closely resembles synthetic rubbers rather than natural rubber.

21 Using chemicals to control NR processability
by Paul A. Danilowicz and Brian C. Howard, Struktol Company. Authors examine several methods of controlling natural rubber processability.

26 Truck tires to meet present and future service requirements
by Lloyd C. Cooper, The Firestone Tire & Rubber Company. A look at how changing and future service requirements are expected to influence the types of truck tires designed to meet the trucking industry's needs.

33 Patent news
edited by Bob Samples, Akron Rubber Development.

37 Rubber Division schedule
Paper schedule for the 127th meeting of the Rubber Division of the American Chemical Society, which will take place April 23-26 in Los Angeles.

43 Technical Focus — Laser technology in the plant and laboratory
by David Given, technical editor. A look at several new applications of laser technology.

45 Techno Mart
New equipment, instruments, CAD/CAM and materials.

51 Compounding ingredients price list
Directory lists compounding ingredients prices based on the latest information supplied by the companies.

Departments

4 Editorial
6 Mailbag
34 Meetings
35 Calendar
68 Jobs & People
70 Literature

Cover

Cover photo courtesy of The Malaysian Rubber Bureau

A Lippincott & Peto Publication

Business Briefs

Acquisitions, expansions

A multi-million dollar expansion at **Monsanto's** Akron, OH marketing and research center will nearly double the size of the existing research and applications laboratories and will provide facilities for additional professional people. The expansion is to be completed second quarter 1985.

The recent 255,000 sq. ft. addition to the **General Tyre & Rubber's** Karachi, Pakistan tire facility tripled the plant's annual capacity to 750,000 units and added approximately 250 employees. The operation manufactures bias passenger, light and medium truck and rear farm tires and tubes. Radials will be in production by the end of the year.

Dieffenbacher GMBH, Eppingen, West Germany has established a North American manufacturing subsidiary in Windsor, Ontario. Dieffenbacher North America will manufacture hydraulic presses up to 12 tons and press lines for various industries.

Arco Chemical Europe will construct a plant to produce its Poly bd liquid resins (liquid hydroxyl terminated homopolymers of butadiene) at its existing petrochemical complex in Rotterdam, The Netherlands. Start up is scheduled for next year.

Burgess Pigments has begun a $3.5 million expansion that will increase capacity of aluminum silicate pigments 120 tons per day.

Compo Industries reached an agreement in principle to acquire **Sidlaw Tile Service** of Anqubar, Scotland, the largest contract backer of modular carpet tile in Europe.

Emery Chemicals expanded separation capacity for the production of oleic, stearic and isostearic acids.

American Hoechst has agreed to purchase the 74% interest of **Hercules, Inc.** in Hercofina, a joint venture of Hercules and America Petrofina. Hercofina manufactures dimethyl terephthalate and terephthalic acid.

BFGoodrich purchased **A&M Engineered Composites**, Marlboro, MS, engineers and fabricators of reinforced plastic structures. BFG also said it plans to sell its Off-Highway Braking Systems Division. The division operates plants in Bloomington, IN, The Netherlands and Brazil and employs 290.

Hercules Specialty Chemical opened a sales office in Magnolia, TX to serve the southwest.

Peeter Cooper Corp.'s facility dedicated to water borne adhesives, hot melt adhesives and chemical curing adhesives in Pineville, NC is scheduled to be completed the first quarter of 1985.

Witco Chemical acquired the Clark, NJ plant and certain other assets of the **Stokes Division** of Exide Corp., a manufacturer of battery cases and parts.

EPE Inc. a supplier of equipment and replacement parts to the rubber industry moved its offices to Strongsville, OH. EPE represents the Carl Aug. Picard Co. of West Germany on a worldwide basis.

United Catalysts, Louisville, KY acquired the **Albion Kaolin Co.**, Hephizibah, GA and plans to expand the mining and production facilities and diversify the line.

Uniroyal Tire acquired **American Tire Co.**, a seven-location chain of retail outlets in the Atlanta, GA area.

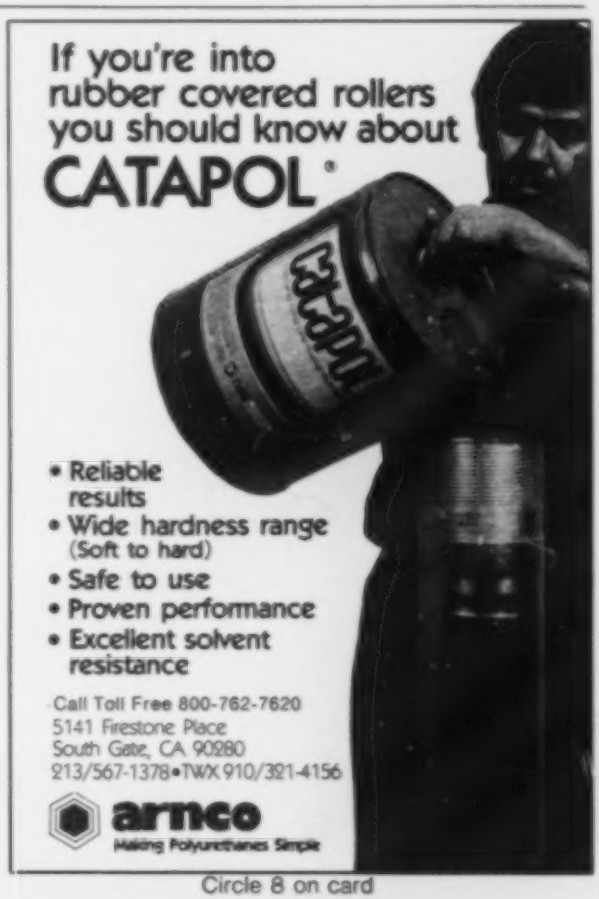
Sidel Inc. a subsidiary of SMTP, Sidel, Paris, a manufacturer of stretch-blowing machines was formed in Atlanta, GA.

The **Industrial Fabrics Association International** opened a Washington, D.C. office.

Ashland Petroleum will expand its carbon fibers pro-

RMA tire & tube report through November 1984
(figures in thousands of units)

	1984	1983	% Change
Passenger Tires			
Shipments			
Original Equipment	47,142	39,775	+18.52
Radial	39,499	33,205	+18.95
Replacement	134,771	125,041	+7.78
Radial	103,014	87,193	+18.14
Export	5,495	3,724	+47.56
Radial	3,996	2,557	+56.28
Total	187,408	168,540	+11.19
Radial	146,509	122,955	+19.16
Production	159,959	143,427	+11.53
Radial	121,373	100,400	+20.89
Truck & Bus Tires			
Shipments			
Original Equipment	7,304	4,981	+46.64
Radial	3,835	2,336	+64.17
Replacement	29,357	27,745	+5.81
Radial	10,416	9,257	+12.52
Export	1,231	933	+31.94
Radial	562	439	+28.02
Total	37,892	33,659	+12.58
Radial	14,813	12,032	+23.11
Production	33,735	28,013	+20.43
Radial	12,688	8,777	+44.56



Circle 8 on card

duction capacity from 30 to 100 tons annually.

PMS Consolidated has opened a Fiber Service Center in Lithia Springs, GA to provide colorant development and testing as well as dispersions and color concentrates for the synthetic fiber industry.

Contracts, licenses

Exxon Chemical America appointed **The C.P. Hall Co.** as its sales agent for the west coast of the U.S. C.P. Hall has offices and warehouse in Torrance, CA.

Prodicon S.r.l., Milan, Italy appointed the **F.A. Ziegler Co.**, Homewood, IL as exclusive agent in the U.S. for marketing of their engineering consulting services and machinery. Prodicon manufactures batch-off machines and cooling lines, conveying and weighing systems, slitters, deflashing and mold cleaning equipment.

Union Carbide licensed the rights from the **General Electric Co.** under a broad range of patents relating to radiation curable epoxide systems. As a result of the arrangement, Union Carbide's customers for its Cyracure cycloaliphatic epoxides will be free to practice the technology covered by approximately 200 GE, 3M and Union Carbide patent rights.

Resinall, a manufacturer of hydrocarbon and rosin based esters, named **Stochem, Inc.**, Mississauga, Ontario as sales representative throughout Canada.

Mozel Chemical Products, Menlo Park, NJ expanded its distribution of **Englehard** products for coatings and adhesives to parts into AK, AL, northern LA and northern MI.

Bridgestone Corp. chose **Mitsubishi International Corp.** as agent for Bridgestone's Cord Switch in the U.S.

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Circle 9 on card

Financial statements

Armstrong Rubber reported net income for the first quarter was $7.4 million on sales of $169.8 million.

Blasius Industries' net earnings for its second quarter were $918,000 on sales of $11.4 million.

Carlisle Corp. reported net earnings of $32.5 million for the year on sales of $527.1 million.

Compo Industries' net income for the first quarter was $418,000 on revenues of $42.1 million.

Cooper Tire & Rubber reported net income for the year amounted to $24.6 million on a record net sales of $555.4 million.

Eagle-Picher had a 1984 net income of $28.1 million on record sales $663.9 million.

Exxon Corp. reported 1984 net income was $5.5 billion on revenues of $97.2 billion.

GenCorp reported that its 1984 net income was $7.2 million and sales were $2.7 billion.

RMA industry rubber report through December 1984 (figures are expressed in metric tons)

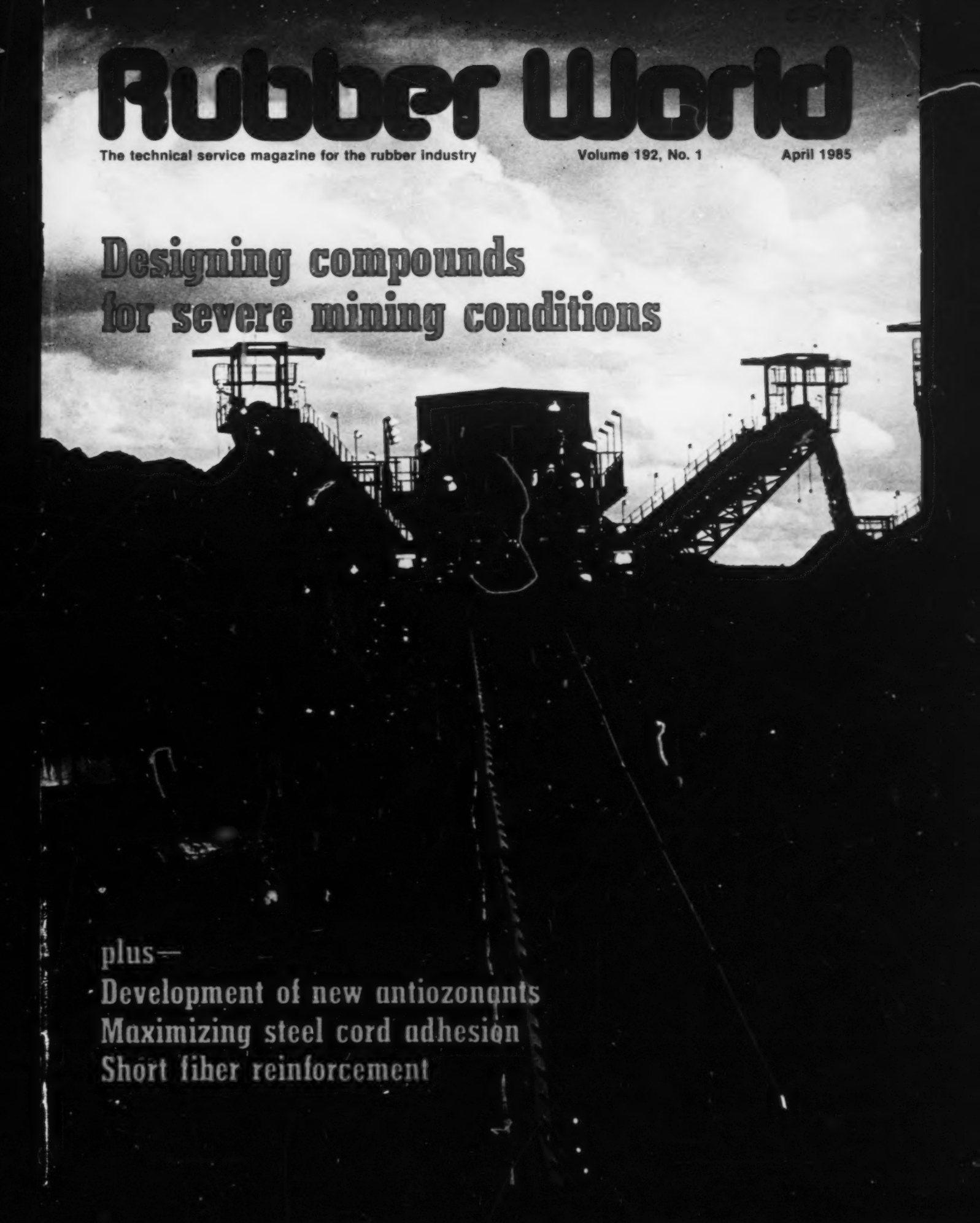
	Cumulative 1984	Cumulative 1983	% Change 84 vs 83
Total New Rubber			
New rubber available	3,131,814	2,805,038	11.65
Imports	1,036,763	868,953	19.31
Exports	385,903	309,769	24.58
Apparent Consumption	2,735,068	2,504,215	9.22
Total Natural Rubber			
Imports	798,851	680,506	17.39
Exports	34,533	18,496	86.71
Apparent Consumption	750,715	676,272	11.01
% Total new rubber	27.44	27.00	
Total Synthetic Rubber			
Production	2,095,051	1,936,085	8.21
Imports	237,912	188,447	26.25
Exports	351,370	291,273	20.63
Apparent Consumption	1,984,353	1,827,942	8.56
% Total new rubber	72.55	72.99	
Total SBR			
Production	958,355	904,486	5.96
Imports	71,603	63,196	13.30
Exports	103,606	85,410	21.30
Apparent Consumption	921,324	887,019	3.87
Total Nitrile			
Production	67,240	55,041	22.16
Imports	11,889	9,093	30.75
Exports	8,542	6,852	24.66
Apparent Consumption	65,263	57,227	14.04
Polybutadiene			
Production	359,308	332,683	8.00
Imports	64,980	48,572	33.78
Exports	24,439	16,258	50.32
Apparent Consumption	411,616	355,540	15.77
Ethylene-Propylene			
Production	214,870	175,229	22.62
Imports	1,321	686	92.57
Exports	33,642	30,453	10.47
Apparent Consumption	175,328	142,539	23.00
Butyl, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	365,481	353,314	3.44
Imports	83,893	59,829	40.22
Exports	137,440	111,517	23.25
Apparent Consumption	320,939	300,324	6.86
Polychloroprene			
Production	129,796	115,334	12.54
Imports	4,226	7,071	-40.23
Exports	43,701	40,783	7.15
Consumption	89,884	85,294	5.39

Rubber World

The technical service magazine for the rubber industry

Volume 192, No. 1 April 1985

Designing compounds for severe mining conditions



plus—

Development of new antiozonants

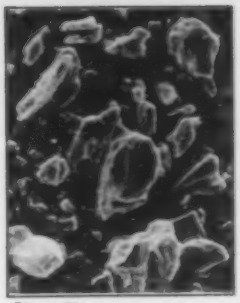
Maximizing steel cord adhesion

Short fiber reinforcement

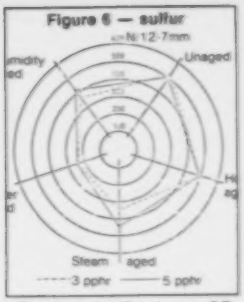
Contents

Vol. 192, No. 1/April 1985

Designing high performance compounds p. 18



Short fiber reinforcement p. 14



Steel cord adhesion p. 37

8 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

14 Tech Service: A whisker in the mix?
by Jon Menough, contributing technical services editor. Author looks at the advantages and disadvantages of a short fiber reinforcement available for rubber.

18 Designing high performance compounds for severe mining service conditions
by G.C. Blackshaw, R.C. Burkey, H.F. Schwarz, Polysar Limited, and D. Kershaw and R.E. Melley, Syncrude Canada Limited. Article discusses factors influencing the design and development of rubber compounds for extra-heavy-duty service in the oil sands and hard rock mining industries.

32 The development of new antiozonants for elastomers
by G. Bertrand and E. Leleu, Vulnax International Limited. Authors look at antiozonants now on the market, all derivatives of p-phenylene diamine, and show the work done to optimize the structure of the substituted p-phenylene diamine derivatives as well as the work done to understand the mechanism of ozone attack and protection. Authors also examine evidence of the antiozonant properties of new chemical families among which are several non-staining antiozonants.

37 Maximize steel cord adhesion using a combined system of cobalt and resorcinol/formaldehyde resin
by P.E.R. Tate, Manchem Limited. Article shows how the achievement and maintenance of high adhesion and compound properties are obtainable by the correct choice and combination of ingredients, even under the most severe aging conditions.

51 Patent news
edited by Bob Samples, Akron Rubber Development.

54 Technical Focus — Clean air is a must in today's manufacturing plants
by David Given, technical editor. A look at dust collecting equipment and solvent scrubbers.

58 Techno Mart
New equipment, instruments, CAD/CAM, products and materials.

Departments

4	Editorial	46	Meetings	70	Jobs & People
5	Mailbag	49	Calendar	73	Literature

Cover

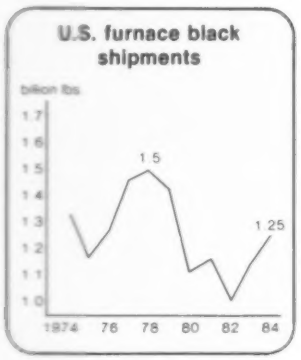
Cover photo courtesy of Syncrude Canada Ltd.

A Lippincott & Peto Publication

72¢/lb., Resin 731S becomes 88¢ and Resin 731SA moves to 78¢/lb. these prices are for truckload quantities. Resin 3072 goes up to 35¢/lb. in bulk quantities. The above prices became effective April 1, 1985.

Akzo Chemie America, Noury Chemicals eliminated its 10¢/lb. temporary price allowance on all grades of MEK peroxides effective April 1, 1985. New price levels for Noury's product line purchased in quantities of 2,000 lbs. or over become: Cadox M-50, $1.52/lb.; Cadox M-30, $1.42/lb.; Cadox MDA-30, $1.42/lb.; and Cadox F-85, $1.62/lb.

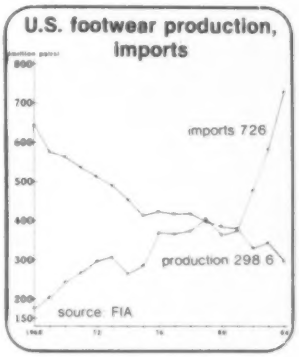
Markets, news



Continuing the recovery which began in 1983, domestic furnace black shipments by U.S. producers increased 10% in 1984 to 2.76 billion pounds according to J.M. Huber Corp. The percentage gain was almost as large as the 11.5% growth in 1983. The year-to-year changes throughout 1984 dropped sharply indicating a maturing of the current business cycle. Whereas the first half of 1984 was 20% greater than 1983's same period, the second half was up by less than 1%, with the fourth quarter of 1984 nearly 1% lower than 1983. Huber's conclusion is that 1985 furnace black demand will decline about 2%. The lower demand will entirely be within the automotive tire sector.

Consumption of black increased in all major end use segments in 1984. Black to tire and tire products gained by over 9%. The combined usage by all other sectors gained in excess of 12%. The U.S. became a net importer of carbon black in 1984 as the 155 million pounds of imports exceeded exports by 81 million pounds. The trade balance was a positive 9 million pounds in 1983 and has declined since 1980 when it was 136 million pounds.

Overcapacity is a problem in the domestic carbon black industry according to Columbian Chemicals as they announced they were closing its Conroe, TX plant. The plant, Columbian's oldest, had an annual capacity of 125 million pounds. The plant's age and geographic location made continued operation uneconomic according to the company.



Domestic footwear production in 1984 dropped 13.3% to its lowest level in 63 years according to Commerce Department figures. Imports rose 25% to their highest level in U.S. history. Domestic manufacturers produced 298.6 million pairs of shoes in 1984, the first time since 1921 that production fell below 300 million. Imports rose to 726 million pairs accounting for 72% of the U.S. market. The U.S. International Trade Commission announced it would begin an investigation into the injury that imports have caused the domestic footwear industry.

Shipments of passenger tires in the U.S. increased 10.78% in 1984 according to the Rubber Manufacturers Association. More than 201 million tires were shipped, 50.9 million in the original equipment market (a 16.3% increase) and 144.5 million were shipped to the replacement market (a 7.9% increase). Shipments of truck and bus tires increased 10.7% in 1984 to 40.8 million. Radials accounted for 76% of passenger and 38% of truck and bus production.

RMA tire & tube shipments & production report
(figures in thousands of units)

Passenger Tires	**1984**	**1983**	**% Change**
Shipments			
Original Equipment	50,993	43,845	+16.30
Radial	42,728	36,599	+16.75
Replacement	144,580	133,964	+7.92
Radial	**109,498**	93,915	**+16.59**
Export	6,064	4,206	+44.17
Radial	4,375	2,899	+50.91
Total	201,637	182,015	+10.78
Radial	**156,601**	133,413	**+17.38**
Production	172,934	156,256	+10.67
Radial	131,512	109,796	+19.78
Truck & Bus Tires			
Shipments			
Original Equipment	7,777	5,519	+40.91
Radial	4,108	2,614	+57.15
Replacement	31,707	30,301	+4.64
Radial	11,332	10,268	+10.36
Export	1,333	1,030	+29.42
Radial	593	483	+22.77
Total	40,817	36,850	+10.77
Radial	16,033	13,365	+19.96
Production	36,441	30,667	+18.83
Radial	13,753	9,740	+41.20

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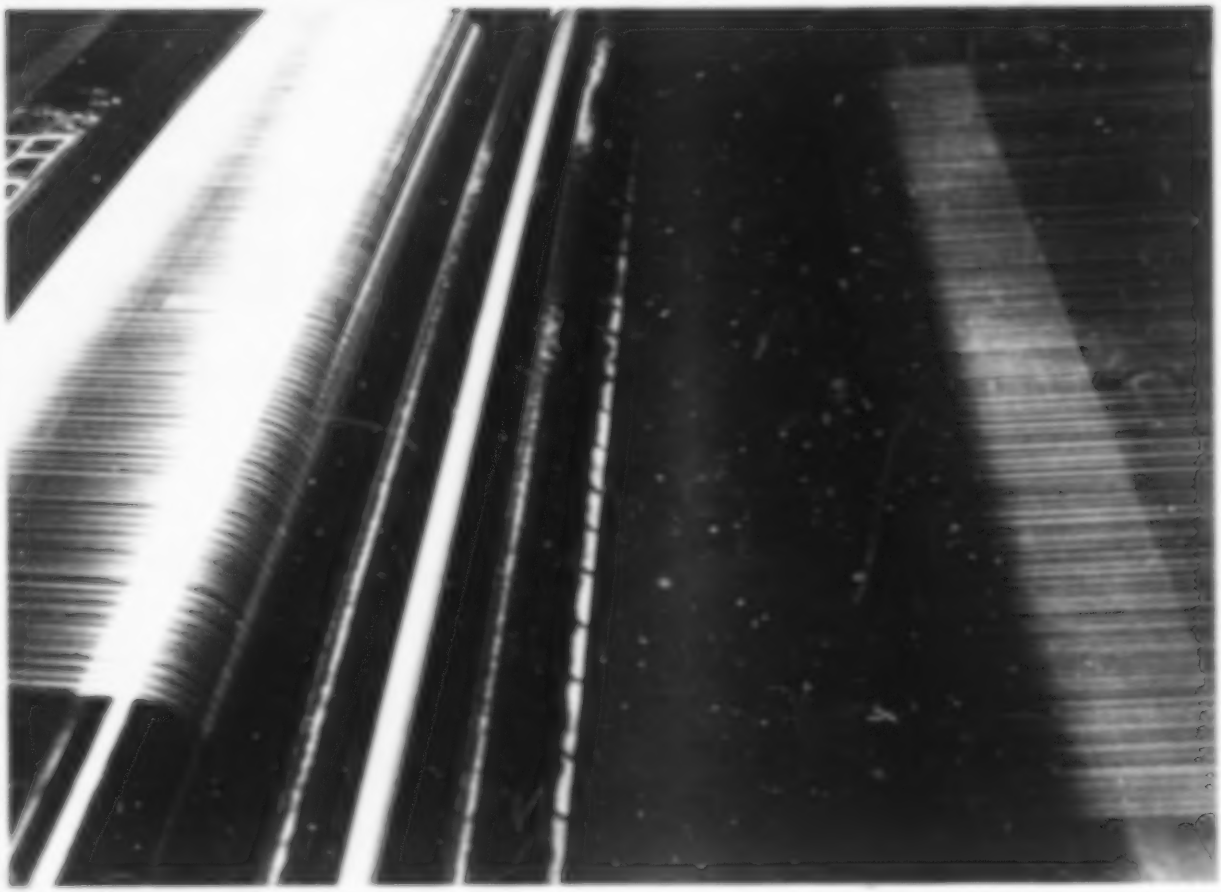
Rubber World

The technical service magazine for the rubber industry

Volume 192, No. 2

May 1985

Fibers & fabrics

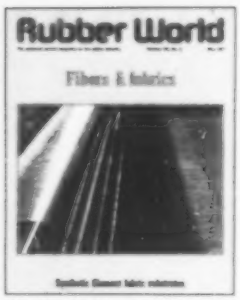


Synthetic filament fabric substrates

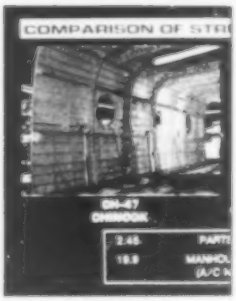
The role of reinforcing fibers in composites

Contents

Vol. 192, No. 2/May 1985



Synthetic filament fabric substrates p. 16



Reinforcing fibers in composites p. 27

Bonding to polyolefinic thermoplastic elastomers p. 38

6 Business Briefs
Acquisitions, expansions, contracts, licenses, financial statements, markets, news

12 Tech Service: Alcryn — an interesting new entry
by Jon Menough, contributing technical services editor. This new family of melt processable rubbers possesses rubber-like qualities as well as thermoplastic, and can be processed on typical rubber machinery

16 Synthetic filament fabric substrates
by David Tarlton and Jack Leach, Burlington Industries, Inc. Author examines properties of fabric substrates and what the buyer should know to make his needs known to the vendor

27 The role of reinforcing fibers in composites
by Paul N. Lagasse, E.I. du Pont de Nemours & Co., Inc. Advanced composites represent one of the growth segments in business and the author looks at these polymer matrices reinforced with specific fibers

29 Crosslinking of epichlorohydrin elastomers
by Helfried Ehrend, Rhein-Chemie Mobay Chemical Corporation. Epichlorohydrins require special vulcanization systems which have to be improved, according to the author, who offers a method to possibly solve existing processing problems

38 Bonding to polyolefinic thermoplastic elastomers
by J.P. Vanderkooi and L.A. Goettler, Monsanto Polymer Products Co. New adhesive technology should enable olefinic thermoplastic vulcanizates to broaden market penetration in areas employing conventional crosslinked rubber

43 Patent news
edited by Bob Samples, Akron Rubber Development

49 Technical Focus — New products for the manufacturing plant
by David Given, technical editor

51 Techno Mart
New equipment, instruments, CAD/CAM, products and materials

Departments

4	Editorial	47	Calendar	62	Literature
44	Meetings	60	Jobs & People	64	Ad Index

Cover

Cover photo courtesy of Burlington Industries, Inc.

A Lippincott & Peto Publication

Blasius Industries reported net earnings of $304,000 on net sales of $10.8 million for the third quarter.

Eagle-Picher Industries reported net income for the first quarter of $4.5 million on sales of $154.7 million.

GenCorp announced it had net earnings for the first quarter of 1985 of $1 million on sales of $626 million.

Martin Marietta reported net earnings of $191.7 million on sales of $3.9 billion for 1984.

Mobay Chemical announced net income for 1984 totaled $73.1 million on net sales of $1.55 billion.

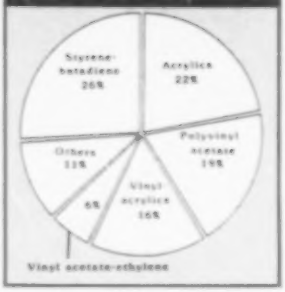
NL Industries reported net income for 1984 of $141.1 million on sales of $1.3 billion.

Rubbermaid announced record net earnings of $11.7 million on record sales of $142 million for the first quarter.

Markets, news

Sales of synthetic latex polymers in the United States during 1984 reached nearly 2.9 billion dry lb. valued at more than $2.1 billion, according to figures from C.H. Kline & Co. The five major latex polymer types — styrene-butadiene, acrylics, vinyl acetate homopolymer, vinyl-acrylics, and vinyl acetate-ethylene — together accounted for almost 89% of the total pounds and over 85% of the dollar value. More than twelve additional minor products made up the balance of volume consumed.

Sales of latex polymers by product 1984 percent of total pounds



Paint and coatings production leads all areas of latex consumption, accounting for over 23% of domestic consumption in 1984. The adhesive, paper, carpet, textile, and nonwoven industries follow in declining order, and together represent approximately 60% of all consumption. At least 14 other consuming industries account for the remaining volume.

Overall growth for latex polymers is projected to average 3% a year through 1988 when demand will reach over 3.2 billion dry pounds. The most rapidly growing major latices will include vinyl acetate-ethylenes, styrene-acrylics, and acrylics. Products projected to grow at below average rates include styrene-butadiene, polyvinyl acetate, and vinyl-acrylic latices.

Major consuming industries where demand is projected to rise at above average rates include printing inks, adhesives, textiles, and caulks and sealants. Slower growth will be seen in carpet, paint and coatings, paper, and nonwovens. The only industry where latex consumption is expected to decline is leather.

Preliminary estimates from the International Rubber Study Group indicate that world rubber consumption in 1984 rose by 915,000 tons to 13.19 million, up 7.5% from 1983 and exceeding the 1979 record of 13.06 million. Synthetic rubber totalled 8.92 million tons and natural rubber 4.27 million tons. Consumption or NR was at the highest level ever, but that of synthetic rubber fell short of its 1979 record.

Natural rubber production rose 310,000 tons, 7.7%, to 4.33 million tons with Indonesia accounting for about two thirds of the rise. All producers with the exceptions of Malaysia, Thailand and Nigeria exceeded 1983 totals. Synthetic rubber production increased by 715,000 tons, 8.6%, with major contributors such as Asia up 17%, North America 12%, and the EEC 9%.

Estimates indicate that several countries may be expected to have raised consumption by 10% or more including: the U.S., 14%; Taiwan, 14%; China, 13%; Canada, 12%; France, 12%; and Brazil, 10%. South Korea led other countries with a rise of 18% to 306,000 tons. The UK and Germany were up 9% each, and Japan and Australia were up 8% each.

RMA tire shipments & production report through January 1985 (figures in thousands of units)

Passenger Tires	1985	1984	% Change
Shipments			
Original Equipment	4,920	4,151	+18.53
Radial	4,116	3,488	+18.00
Replacement	11,208	10,709	+4.66
Radial	9,238	8,169	+13.09
Export	554	522	+6.13
Radial	446	355	+25.63
Total	16,682	15,382	+8.45
Radial	13,800	12,012	+14.89
Production	14,971	13,815	+8.37
Radial	11,807	10,062	+17.34
Truck & Bus Tires			
Shipments			
Original Equipment	619	604	+2.48
Radial	390	317	+23.03
Replacement	2,540	2,409	+5.44
Radial	1,041	862	+20.77
Export	124	114	+8.77
Radial	59	43	+37.21
Total	3,283	3,127	+4.99
Radial	1,490	1,222	+21.93
Production	3,410	2,934	+16.22
Radial	1,413	1,062	+33.05

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Rubber World

The technical service magazine for the rubber industry

Volume 192, No. 3

June 1985

Emphasis on tires

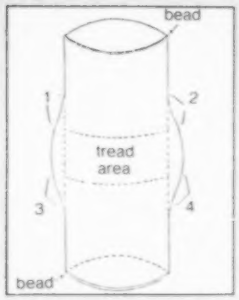
Applying FEM to tire analysis

Water-based tire tread adhesives

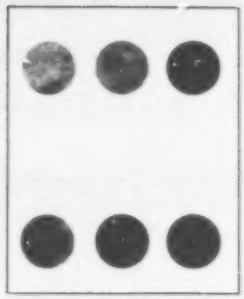
Contents

Vol. 192, No. 3/June 1985

Finite element tire design p. 4



Water based tire tread adhesives p. 29



Curative diffusion p. 34

6 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

12 Tech Service: Blending the unblendable?
by Jon Menough, contributing technical services editor. The recent Rubber Division meeting unveiled a new material — a blending of silicone rubber and EPDM, which offers opportunities for various applications.

14 The application of finite element method to tire design
by N. Yoshimura, Bridgestone Corp. FEM has been used for years in tire analysis. Author discusses how this tool can be incorporated into daily tire design procedures.

29 Water-based tire tread adhesives
by W.T. Tai, Nalco Chemical Co. Author gives general description of the water-based tread-bottom adhesives and claims they perform as well as or better than solvent-based adhesives.

33 Classification of carbon black
by A.K. Bhowmick, India Institute of Technology. Article addresses some of the difficulties of carbon black classifications and offers suggestions to alleviate the problems.

34 Practical aspects of curative diffusion
by Robert F. Ohm, R.T. Vanderbilt Co. Curative diffusion can exhibit beneficial or detrimental effects. Several examples of both are examined in the areas of bloom, partitioning in blends, adhesion and vulcanization.

39 Patent news
edited by Bob Samples, Akron Rubber Development.

45 Technical Focus — Recent developments for the tire industry
by David Given, technical editor.

47 Techno Mart
New equipment, instruments, CAD/CAM, products and materials.

Departments

4	Editorial	55	Calendar	58	Literature
41	Meetings	56	Jobs & People	60	Ad Index

Cover

Courtesy of Mobay Chemical Corp.

A Lippincott & Peto Publication

Essex Chemical announced first quarter net income amounted to $2.4 million on net sales of $45.7 million.

Exxon reported net income of $1.3 billion on revenues of $23.1 billion for the first quarter.

BFGoodrich reported net income of $2.3 million on revenues of $798.7 million for the first quarter.

Goodyear reported first quarter net income of $86.7 million on sales of $2.46 billion.

The **Hoechst Group** announced first quarter profits before taxes of $259 million on sales of $3.4 billion.

Jones & Vining announced net earnings for the first quarter of $578 thousand on sales of $9.5 million.

Lubrizol announced first quarter net income of $19.4 million on revenues of $255.5 million.

Lydall reported first quarter net income of $1 million on net sales of $28.1 million.

Myers Industries announced net income of $762 thousand on net sales of $18.8 million for the first quarter.

NL Industries reported first quarter net income of $4.4 million on sales of $327 million.

Park-Ohio Industries announced first quarter net income of $555 thousand on net sales of $56.1 million.

Sheller-Globe reported earnings of $11.3 million for the second quarter on sales of $245.7 million.

Standard Products reported net income for the third quarter of $5.9 million on sales of $100.1 million.

Sybron reported earnings of $2.6 million on sales of $126.4 million for the first quarter.

Uniroyal announced income for the first quarter of $21 million on sales of $508 million.

Yokohama Rubber reported ordinary income of ¥3.8 billion on sales of ¥280.3 billion for 1984.

Markets, news

Saying "This agreement meets the union's objectives for 1985 and the next three years," United Rubber Workers president Milan Stone inked an agreement with BFGoodrich which set the pattern for the other Big Four U.S. rubber companies, Goodyear, Firestone and Uniroyal. The agreement provides for a general wage increase over the three years of 43 cents (25 cents the first year, 10¢ and 8¢ the following years) and maintains the URW's .26 cost of living allowance formula which is estimated to yield $1.89 in raises over the three years, assuming a 5% inflation rate. The union and management worked out revised medical coverage programs with the companies as well. Some 36,000 workers are included in the Big Four contracts out of a total membership of 130,000.

Thermoplastic elastomers should grow at a 7.5% per year rate through 1989, reaching a total of 457 million pounds, according to a report by the Business Communications, Co., Stamford, CT. In 1984, total consumption of TPE's reached 319 million pounds. Styrene based materials accounted for 165 million pounds, urethanes 62 million, olefins 58 million, copolyester-polyethers 19 million and others 15 million. Copolyester-ethers will show the biggest gain, growing at 12.3% during the time frame. Olefinics growth rate is pegged at 10.6%, urethanes at 6.3% and styrene based TPE's at 5.1%.

The aftermarket for automotive parts in Europe will be nearly stalled through 1994, growing less than 1% a year, according to a study by Frost & Sullivan. Longer life of replacement parts, a decelerating increase in the number of cars and the shrinkage of the average distance driven annually are given as causes for the slight growth.

RMA tire shipments & production report through February 1985 (figures in thousands of units)

Passenger Tires	1985	1984	% Change
Shipments			
Original Equipment	9,264	8,655	+7.04
Radial	7,740	7,238	+6.94
Replacement	19,621	20,823	−5.77
Radial	15,768	15,842	−0.47
Export	1,184	1,028	+15.18
Radial	948	743	+27.59
Total	30,069	30,506	−1.43
Radial	24,456	23,823	+2.66
Production	29,296	28,308	+3.49
Radial	23,138	20,710	+11.72
Truck & Bus Tires			
Shipments			
Original Equipment	1,202	1,209	+0.58
Radial	760	624	+21.79
Replacement	4,515	4,548	−0.73
Radial	1,800	1,587	+13.42
Export	260	217	+19.82
Radial	134	96	+39.58
Total	5,997	5,974	+0.05
Radial	2,694	2,307	+16.78
Production	6,460	5,937	+8.81
Radial	2,733	2,150	+27.12

RMA rubber report through January 1985 (figures in metric tons)

	Cumulative 1985	Cumulative 1984	% Change 85 vs 84
New Rubber			
New rubber available	260,551	288,548	−9.70
Imports	90,657	109,350	−17.09
Exports	27,943	27,930	.05
Apparent Consumption	227,559	247,245	−7.96
Natural Rubber			
Imports	72,782	89,254	−18.46
Exports	3,067	2,217	38.34
Apparent Consumption	71,759	73,745	−2.69
% Total new rubber	31.53	29.82	
Synthetic Rubber			
Production	169,804	179,198	−5.19
Imports	17,875	20,096	−11.05
Exports	24,876	25,713	−3.26
Apparent Consumption	155,799	173,499	−10.20
% Total new rubber	68.46	70.17	
SBR			
Production	78,738	84,589	−6.92
Imports	5,464	6,270	−12.85
Exports	6,531	8,099	−19.36
Apparent Consumption	70,512	80,826	−12.76
Nitrile			
Production	5,484	5,7511	−4.64
Imports	1,167	948	23.10
Exports	676	669	1.05
Apparent Consumption	5,140	5,763	−10.81
Polybutadiene			
Production	29,382	30,298	−3.02
Imports	4,288	4,425	−3.10
Exports	1,474	2,077	−29.03
Apparent Consumption	31,706	31,685	.07
Ethylene-Propylene			
Production	17,550	14,329	22.48
Imports	179	57	214.04
Exports	2,732	1,872	45.94
Apparent Consumption	16,269	15,383	5.76
Butyl, Polychloroprene, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	36,741	44,232	−12.41
Imports	6,777	8,396	−19.28
Exports	13,463	12,996	3.59
Apparent Consumption	32,172	39,841	−19.25

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Rubber World

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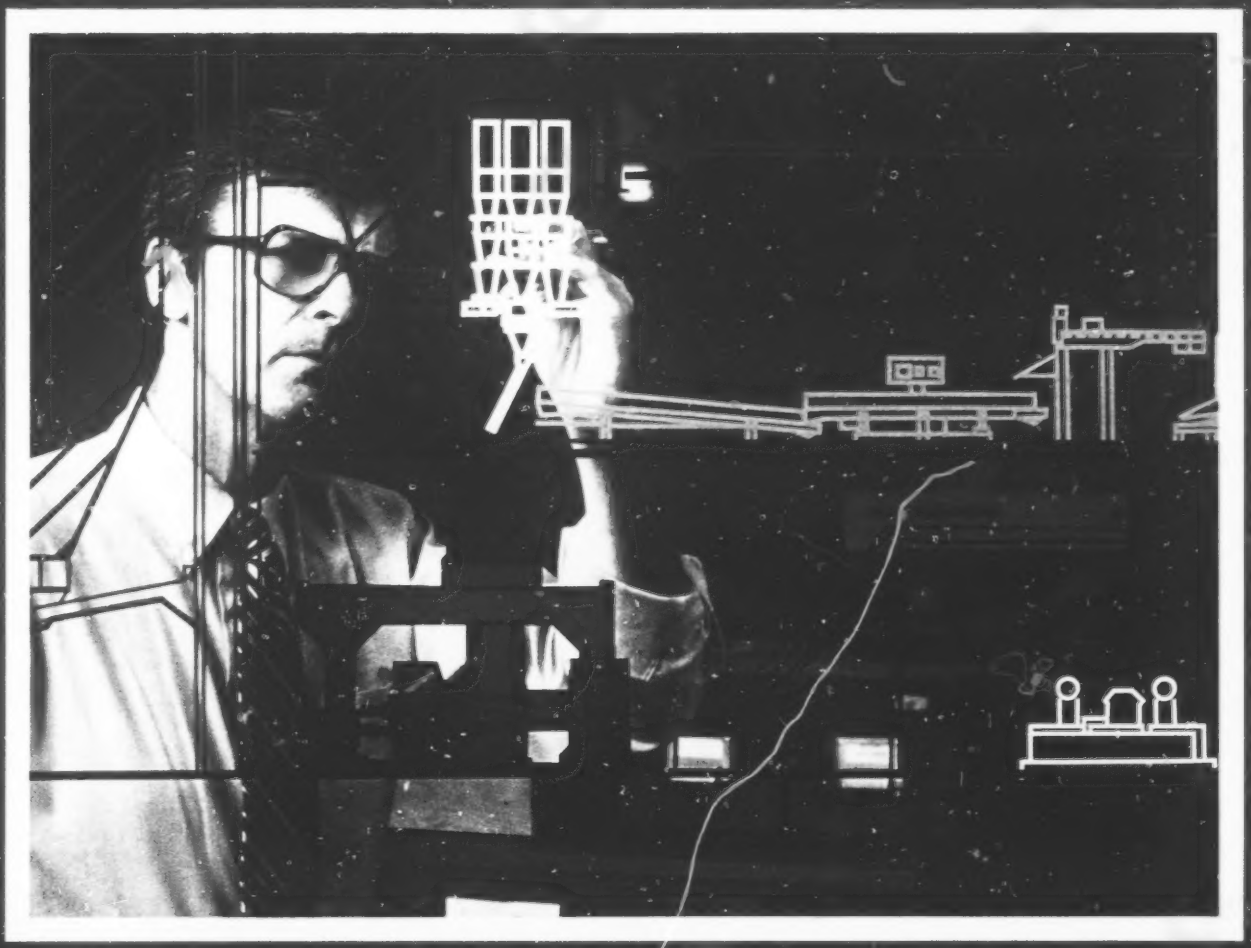
Machinery & equipment



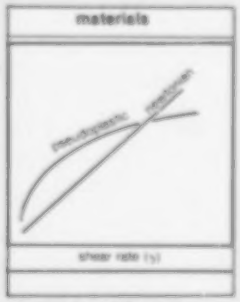
Injection molding of elastomers

Automation of manufacturing

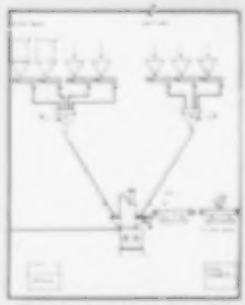
Contents

Vol. 192, No. 4/July 1985

Machinery and equipment p. 8



Injection molding of elastomers p. 14



Plant automation p. 24

6 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements, markets, news.

12 Tech Service: The other side
by Jon Menough, contributing technical services editor. A look at external technical service, helping customers overcome problems using your products.

14 Injection molding of elastomers
by Rudolph F. Karg, Charles E. Boozer and Robert E. Benefield, Copolymer Rubber & Chemical. Authors look at ways of developing formulations with good processing characteristics for the injection molding of elastomers.

24 The step by step introduction of automation in the rubber industry
by Uwe Scheffler, Waeschle Maschinenfabrik GmbH. After outlining the principle structure of a rubber plant, author explains how automation can be installed.

33 A new oscillating-die type curemeter for quality control testing
by Chikao Tosaki, Keijiro Ito and Kazuhiko Ninomiya, Japan Synthetic Rubber Co., Ltd. Article looks at a new curemeter which removes frictional contribution to the torque, a common problem associated with rheological measurements in the rubber industry.

40 Used, rebuilt machinery suppliers and capabilities
A grid on rebuilding capabilities of suppliers to the rubber industry is accompanied by an industry directory.

44 Instrumentation and test equipment suppliers
A grid listing the types of instrumentation and test equipment suppliers have to offer to the rubber industry is accompanied by a supplier directory.

55 Corporate profile '85

84 Patent news
edited by Bob Samples, Akron Rubber Development.

85 Technical Focus — Machinery and equipment: New or rebuilt?
by David Given, technical editor.

87 Techno Mart
New equipment, instruments, CAD/CAM, products and materials.

Departments

4	Editorial	53	Calendar	99	Literature
49	Meetings	87	Jobs & People	100	Ad Index

Cover

Courtesy of Contract-Engineering Division, Farrel Company, Emhart Machinery Group

A Lippincott & Peto Publication

Processing machinery imports increasing

The strong U.S. dollar was made evident again with the latest release from the government concerning the imports and exports of machinery used for molding and forming rubber and plastic articles. Based on dollar amounts, imports of injection molding machinery more than doubled in 1984 while imports of extrusion machines increased 74%. Although imports of tire forming machines declined in 1984, for the third year in a row, statistics for the first quarter of 1985 show imports running 1½ times more than the same period in 1984.

More than $131 million worth of injection molding machinery was imported into the U.S. in 1984 compared to $60.4 million the previous year. First quarter 1985 statistics show the trend continuing as these imports are running 20% higher than in 1984. Exports of injection molding machines is also on the increase. After a four year downward slide, exports increased to $19 million in 1984 compared to $11.7 million in 1983, but still way below the $46.1 million registered in 1980. First quarter figures show 1985 is more than 2½ times more than 1984's figures.

U.S. exports of extrusion machinery historically outstripped imports until 1982. But imports now are way ahead, totalling $34.5 million in 1984 compared to $13.8 million for exports. The import rate doubled for the first quarter of 1985 compared to the first quarter of 1984 and even though exports increased as well, the gap is increasing between the two. First quarter results for 1985 show imports of extrusion equipment have doubled over 1984 to $14.4 million while exports increased almost 50% to $5.4 million.

The U.S. has always been a leader in tire forming machinery, but the strong dollar coupled with the weakened economies of many of the major trading countries have led to continued declines in exports since 1979 when the dollar volume reached $40.6 million. Exports dropped to $19.8 million in 1983, with a slight increase in 1984 projected, but final figures for that year are unavailable. First quarter 1985 shipments are 43% below 1984. Imports of tire making machinery increased from 1979 to 1981 but then took a big dip the next three years, bottoming out to $7.1 million in 1984 compared to $44.5 million in 1981. Much of the earlier figures are attributed to the fact that several foreign tire makers set up manufacturing facilities in the U.S. and imported machinery. Also keeping imports down is the fact that many U.S. manufacturers of tire making machinery license a number of foreign producers, most of which are prohibited to export to the U.S. under terms of the agreement.

The major foreign supplier of rubber machinery is West Germany, ac-

Injection-molding machines used for processing rubber and plastics articles: U.S. imports for consumption, by principal sources, (in thousands of dollars)

Source	1979	1980	1981	1982	1983	1984
Fr. Germ	25,141	20,509	19,632	14,433	20,527	36,482
Canada	10,280	11,130	11,804	11,917	16,018	34,107
Japan	14,469	13,645	12,598	10,536	14,113	40,634
Italy	5,471	3,824	3,769	2,470	3,336	5,976
Austria	1,117	530	215	554	1,628	6,130
France	4,394	2,524	3,986	2,406	1,465	2,403
Austral.	258	913	517	—	1,325	—
Switzld.	389	734	1,531	961	1,077	3,458
Ireland	5	—	—	11	152	—
U. King.	958	1,251	632	316	150	398
All other	703	342	2,021	1,417	624	570
Total	63,183	56,403	56,505	45,023	60,416	131,075

Source: Compiled from official statistics of the U.S. Department of Commerce.

Machines used for molding or forming pneumatic tires and parts thereof: U.S. imports for consumption, by principal sources, (in thousands of dollars)

Source	1979	1980	1981	1982	1983	1984
Canada	1,095	1,339	1,642	1,267	1,591	256
Japan	62	907	6	96	1,547	3,269
Fr. Germ.	1,624	416	757	1,038	1,543	1,474
France	25,737	29,150	39,810	12,475	1,522	573
Italy	607	2,071	940	579	537	207
Denmark	49	49	446	505	529	23
Nethlds.	6	—	1	76	501	1,194
U. King.	1,065	1,236	693	326	406	75
Belgium	129	69	112	33	155	—
Switzld.	46	4	2	109	64	—
All other	48	320	218	196	71	—
Total	30,469	35,561	44,626	16,696	8,466	7,093

Source: Compiled from official statistics of the U.S. Department of Commerce.

Extrusion machines used for processing rubber and plastics articles: U.S. imports for consumption, (in thousands of dollars)

Source	1979	1980	1981	1982	1983	1984
Fr. Germ	11,319	15,776	13,863	16,228	11,655	22,562
Italy	1,211	1,379	5,026	2,749	1,815	4,349
Canada	1,208	744	856	1,080	1,738	1,689
U. King.	500	567	494	2,628	1,361	426
France	3,504	253	479	345	823	1,470
China	115	58	89	179	795	607
Japan	1,108	2,942	4,260	1,521	634	2,281
Switzld.	7	554	515	—	326	—
Austria	406	272	632	80	271	332
Hg. Kong	41	26	—	35	155	—
All other	716	788	3,346	3,942	333	346
Total	20,134	23,367	29,561	27,886	19,906	34,571

Source: Compiled from official statistics of the U.S. Department of Commerce.

U.S. imports/exports of machines used for molding or otherwise forming rubber or plastic articles and parts thereof: (in thousands of dollars)

	1979	1980	1981	1982	1983	1984	First Quarter 1984	First Quarter 1985
Injection molding machinery imports	63,183	55,403	56,505	45,023	60,416	131,075	29,020	35,497
Exports	29,021	46,160	45,075	27,833	11,795	19,612	3,124	6,392
Extrusion machinery imports	20,134	23,357	29,561	27,886	19,906	34,571	7,010	14,402
Exports	25,522	36,171	34,361	24,613	13,774	13,864	3,693	5,440
Tire forming machinery imports	30,489	35,561	44,526	16,698	8,466	7,093	4,816	
Exports	40,592	39,264	34,244	33,156	19,865	NA	6,288	3,564

counting for nearly 40% of the imports. Canada and Japan were next, both combining for nearly 36% of the machines imported. France accounted for about 80% of the tire forming machines imported into the U.S. in the years 1979-1981, reflecting the decision by Michelin to build tires in the U.S. France's imports of these machines in 1983 were 85% less than that of 1981.

Breakdown of leading importers by types of machinery show Germany, Canada and Japan the leading injection molding importers, the same three along with France for tire making machinery and Germany the largest exporter to the U.S. of extrusion equipment followed by Italy, Canada and the United Kingdom.

The pattern of U.S. exports for this machinery shows a high of $341.6 million in 1981 before the reversal brought upon by the worldwide recession. Injection molding machine exports dropped 58% by 1983 and extrusion machines declined 43%. Canada, Mexico and the United Kingdom account for nearly 40% of the total U.S. exports of rubber and plastics machinery. Canada and Mexico are the top markets for injection molding equipment and extrusion machines along with India and the United Kingdom.

Injection-molding machines used for processing rubber and plastics articles: U.S. exports of domestic merchandise, by principal markets, (in thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	10,146	15,327	15,003	5,934	3,738
Mexico	3,996	8,081	13,447	10,799	3,138
Colomb	1,596	1,433	323	2,539	844
China	460	237	637	1,934	766
Singapr	135	85	—	228	535
Australia	310	578	986	644	522
Jamaica	7	—	—	—	445
Fr. Germ.	257	1,737	215	50	322
France	109	865	1,314	825	240
Venez.	2,965	1,490	2,426	1,641	231
All other	9,041	16,329	10,723	3,239	1,011
Total	29,021	46,160	45,075	27,833	11,795

Source: Compiled from official statistics of the U.S. Department of Commerce

Extrusion machines used for processing rubber and plastics articles: U.S. exports of domestic merchandise, by principal markets, (in thousands of dollars)

Market	1979	1980	1981	1982	1983
Canada	4,704	3,688	5,966	3,804	3,570
Mexico	2,750	4,769	7,765	7,299	1,705
India	592	2,451	1,995	159	1,546
U King	3,616	2,567	3,702	1,562	1,153
Venez	304	3,222	424	779	883
Zimbabw	—	—	—	—	569
Hg. Kong	13	13	11	301	434
Austral	1,123	683	1,524	1,667	379
Israel	163	77	159	393	358
Japan	315	677	1,277	673	347
All other	11,941	18,046	11,539	7,775	2,810
Total	25,522	36,171	34,361	24,613	13,774

Source: Compiled from official statistics of the U.S. Department of Commerce

Today, thanks partly to the efforts of the American Heart Association, the death rate from rheumatic heart disease has declined more than 70 percent since 1950.

For decades, the American Heart Association's educational programs have taught parents about the dangers and prevention of rheumatic fever and rheumatic heart disease in young children.

The effort was worth it.

Your gift to the American Heart Association can mean life and hope for many. Perhaps someone close to you.

Support the American Heart Association. We're fighting for your life.

American Heart Association

WE'RE FIGHTING FOR YOUR LIFE

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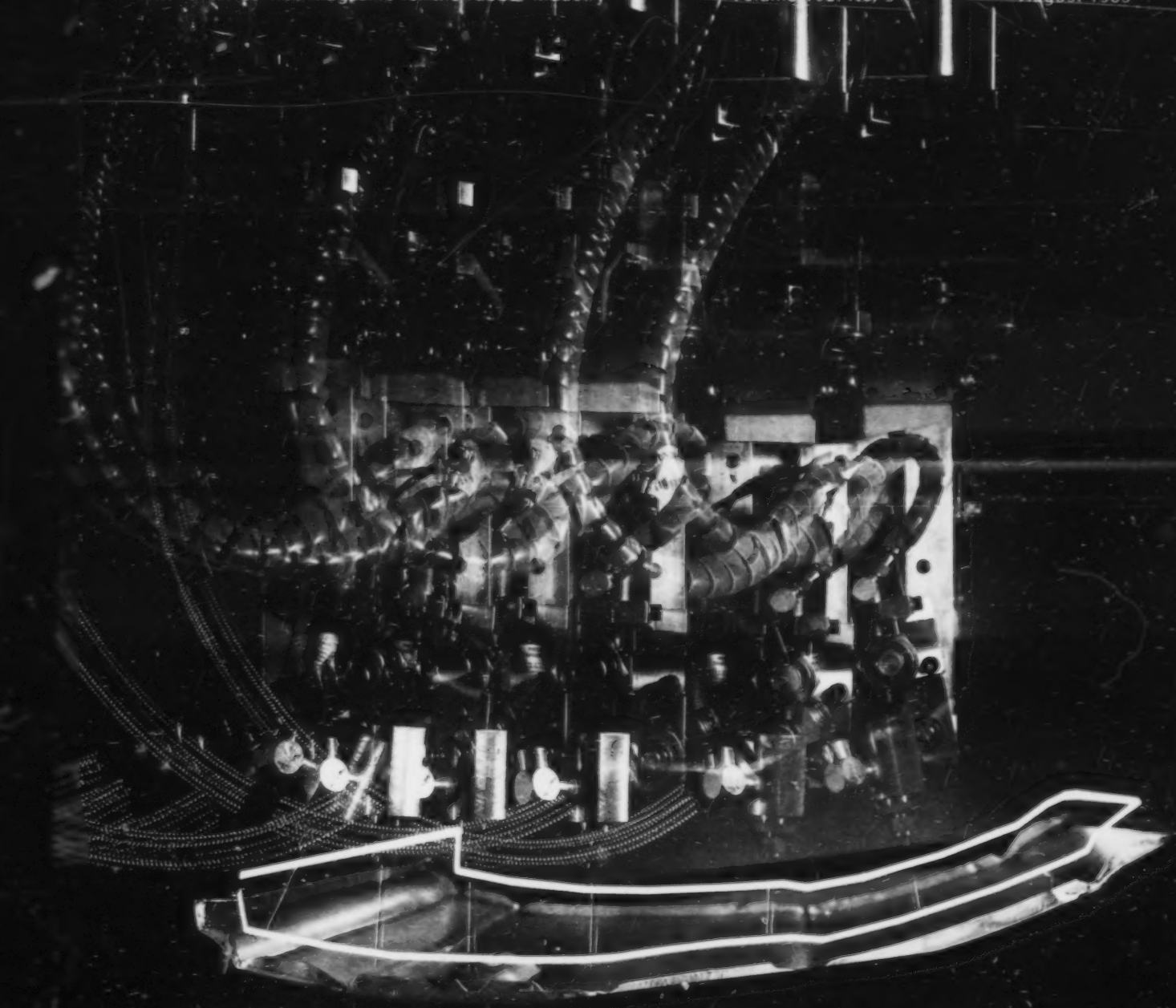
Rubber World

The technical service magazine for the rubber industry Volume 192, No. 5 August 1985



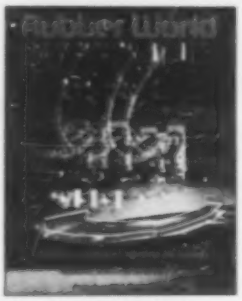
Automated dispensing of adhesives and sealants

Vulcanization, network structure and properties

Fumed silica in RTV-1 silicone sealants

Contents

Vol. 192, No. 5/August 1985



Trends in automated dispensing p. 14

Vulcanization p. 20

Fumed silica p. 29

6 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets; news

12 Tech Service: Ignorance of the law
by Jon Menough, contributing technical service editor. A 1984 EPA ruling regarding the generation of polychlorinated biphenyls affects the silicone rubber industry but little information is available from suppliers.

14 Recent trends in automated dispensing of adhesives and sealants
by Richard J. Pilarski, Robotics, Inc. An overview of the technologies now available along with a discussion of new applications for automated bonding and sealing.

20 Vulcanization, network structure and properties
by T.H. Kuan, BFGoodrich Co. Article highlights basic principles underlying the vulcanization process and discusses the mechanisms of accelerated sulfur vulcanization and the effect of network structure on vulcanizate properties.

29 The effect of fumed silica in RTV-1 silicone rubber sealants
by H. Cochrane and C.S. Lin, Cab-O-Sil Division, Cabot Corp. Authors examine how variations in the properties of the fumed silica fillers can affect the compounding, rheological and cured physical properties of silicone sealants.

44 Patent news
edited by Bob Samples, Akron Rubber Development.

45 Technical Focus — RTV sealants replace fasteners, gaskets, seals
by David Given, technical editor.

47 Techno Mart
New equipment, instruments, products and materials.

Departments

4	Editorial	41	Calendar	58	Literature
37	Meetings	54	Jobs & People	60	Ad Index

Cover

Cover photo courtesy of Consultech Communications Inc.

A Lippincott & Peto Publication

Business Briefs

Acquisitions, expansions

The **Stepan Co.**, Northfield, IL acquired the polyurethane and polyol business of **Reichhold Chemical** for an undisclosed sum. Sale includes design, technology, customer lists and inventories of raw materials and finished goods, but does not include plant and equipment.

Witco Chemical expects to complete its $2 million-plus modernization and expansion at the Newark, NJ plant operated by its Humko Chemical division by the end of the third quarter. The expansion will increase capacity for making fatty chemicals by 40%.

Parker Hannifin has agreed to acquire **Schrader Bellows** for approximately $77.5 million in cash. Schrader Bellows manufactures pneumatic automation products.

ICI Americas will acquire the principal lines of business and related assets of **Pigment Dispersions Inc.**, Edison, NJ a manufacturer of specialty dispersion for urethanes and thermoset materials and liquid colorants for thermoplastics.

Union Carbide is constructing a facility to produce polyketone polymers at its Marietta, OH plant. Commercial introduction of these new high temperature engineering thermoplastics, under the Kadel tradename, is planned for next year.

Essex Chemical acquired **Polymer Technology Corp.**, Sausalito, CA, a custom formulator of casting systems used to encapsulate light emitting diodes and other optoelectronic devices.

Goodyear has opened a powder coatings laboratory at its Akron, OH facility to explore new powder coating resins and provide high technology service to coating makers.

NL Industries agreed to acquire the **Spencer Kellogg** division of Textron, Inc., a supplier of specialty resins to the coatings, ink, electrical and adhesives industries with headquarters in Buffalo, NY and six manufacturing facilities.

Compo Industries and **Ausimont**, the specialty chemicals subsidiary of Montedison plan to merge. The new company will be headquartered in Waltham, MA.

Amspec Chemical signed a letter of intent to produce and market antimony oxide with the Chinese government. A state-of-the-art antimony plant will be built in Yiyang, Hunan which will have an annual production capability of 3,000 to 5,000 metric tons of various grades of antimony oxide. The products manufactured at the Hunan plant will be marketed worldwide by Amspec.

Badische Corp., Williamsburg, VA has agreed to acquire the fiber business of **American Enka Corp.**, Enka, NC with manufacturing plants in Enka, Lowland, TN and Clemson, SC.

J.J. Short Associates, Inc. opened its new 12,500 sq. ft. office and manufacturing facility in Macedon, NY. Short produces custom rubber products.

Bemis Co., Minneapolis, MN acquired the assets of **Master Conveyor Corp.**, Englewood, CO a manufacturer of automated palletizing, conveying and stretch wrapping systems.

Bemis also acquired the "Raptite" product line for the **Aktron Corp.**, Pompton Plains, NJ. Raptite is a pass-through type pallet stretch wrapping machine.

Thomas C. Blair has opened an industrial microscopy lab to serve the rubber and plastics industries in Garretsville, OH.

Mitsui Petrochemical Industries Ltd., Tokyo, Japan has become the 46th member of the International Institute of Synthetic Rubber Producers.

Plasma Coatings, Inc., Waterbury, CT has completed an expansion which increases their coating capacity by 33%.

Bridgestone Tire Company of America is expanding its headquarters in Torrance, CA, adding on 17,095 sq. ft. The $1.5 million expansion is scheduled to be completed in November. Bridgestone also broke ground for a tire warehouse/distribution center in Addison, IL. The 260,000 sq. ft., $9 million facility incorporates 6,300 sq. ft. of engineering office and training space as well.

Newport Corp. completed its 78,000 sq. ft. manufacturing plant in Fountain Valley, CA dedicated to production of the company's line of vibration control products.

Witco Chemical established a southwest regional office that consolidates its area sales offices and corporate de-

RMA rubber report through April 1985 (figures in metric tons)

	Cumulative 1985	Cumulative 1984	% Change 85 vs 84
New Rubber			
New rubber available	1,056,465	1,102,281	−3.25
Imports	387,515	378,123	2.48
Exports	120,863	118,282	2.18
Apparent Consumption	920,536	965,741	−4.68
Natural Rubber			
Imports	300,065	294,946	1.74
Exports	13,432	7,250	85.27
Apparent Consumption	281,043	281,816	− .27
% Total new rubber	30.53	29.18	
Synthetic Rubber			
Production	676,950	724,156	−6.24
Imports	87,450	83,177	5.14
Exports	107,431	111,032	−3.24
Apparent Consumption	639,493	683,925	−6.50
% Total new rubber	69.46	70.81	
SBR			
Production	300,975	338,690	−11.14
Imports	28,350	25,163	12.67
Exports	29,287	33,524	−12.64
Apparent Consumption	293,566	318,673	−7.88
Nitrile			
Production	21,543	21,621	− .36
Imports	4,649	3,902	19.14
Exports	2,474	2,443	1.27
Apparent Consumption	21,499	23,765	−9.54
Polybutadiene			
Production	119,921	119,109	.68
Imports	22,420	24,470	−8.38
Exports	7,923	8,203	−3.41
Apparent Consumption	136,656	135,892	.56
Ethylene-Propylene			
Production	78,167	74,487	4.94
Imports	329	251	31.08
Exports	10,087	11,254	−10.37
Apparent Consumption	64,410	59,206	8.79
Butyl, Polychloroprene, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	158,345	170,251	−6.99
Imports	31,702	29,391	7.86
Exports	57,660	55,608	3.69
Apparent Consumption	123,361	146,389	−15.73

Business Briefs

partments and relocates its Pearsall Chemical division headquarters at a single site, its headquarters for its Concarb division in Houston.

Abtrex Industries, Inkster, MI has set up an Indiana division, located in South Bend, formed by the acquisition of Blast Kote, Inc. together with the merging of American Fiberglass Fabricators and a Pennsylvania division in Leetsdale which was formerly Industrial Elastomers, Inc.

Contracts, licenses

American Synthetic Rubber has been appointed exclusive U.S. distributor for Calprene polymers manufactured by **Calatrava Empressa Para La Industria Petroquimica, S.A.**, Madrid, Spain. The products include butadiene-styrene thermoplastic rubbers in addition to block type copolymers.

Baychem International, Houston, TX has entered into an agreement with **El Paso Products**, Odessa, TX to develop and produce atactic polyalpholefins. Production is targeted for early 1986 with an initial production capacity of 25 mm pounds per year. Baychem will have full responsibility for post modification and marketing of these products while El Paso will have manufacturing responsibility.

Arco Chemical will market in the U.S. the **Fratelli-Lamberti S.p.A.** Albizzate, Italy, line of photoinitiators for use in radiation cure inks, coatings and adhesives.

Akzo Chemie America, Chicago, IL and **Avebe America**, Hopelawn, NJ have formed a joint venture to produce and market gluconates in North America. The partners have acquired a currently idle gluconate plant and facilities in Janesville, WI with initial production scheduled for early fall.

The Plastic Service Centers of **Borg-Warner Chemicals** have been appointed as nationwide distributors of **Mobay Chemical's** line of Texin thermoplastic urethane elastomer resins. Bay State Polymer Distribution Inc. will continue to distribute Texin thermoplastic urethane elastomer resins. Bay State Polymer Distribution Inc. will continue to distribute Texin products in the Great Lakes region.

Lutz Industrial Reps, Lenexa, KS has been selected as manufacturers representatives by **Hydralign** for its web guiding systems and web handling accessories.

Financial statements

Cooper Tire & Rubber announced second quarter sales of $130.2 million with earnings of $4.4 million.

Eagle-Picher Industries reported second quarter sales of $174.6 million and net income of $7.3 million.

GenCorp reported net income for the second quarter of $35.3 million on sales of $763 million.

BFGoodrich announced a net loss for the second quarter of $352.2 million. Sales were $849.4 million.

Brad Ragan Inc. had revenues of $191.4 million and net income of $787,000 for the fiscal year ended April 30, 1985.

Rubbermaid reported second quarter net income of $11.9 million on sales of $148 million.

Carbon black industry in the USA (metric tons)

		1st Qtr. 1985	Percentage change from 4th Qtr. '84	Percentage change from 1st Qtr. '84
N-100 (SAF)	Prod.	6,450	+ 2.7%	+ 6.8%
	Ship.	6,447	+ 7.3%	+ 1.3%
N-200 (ISAF)	Prod.	34,982	+ 0.4%	(1.3%)
	Ship.	34,089	(2.3%)	(6.9%)
N-300 (HAF)	Prod.	129,573	(10.5%)	(9.0%)
	Ship.	130,099	(8.2%)	(5.6%)
N-500 (FEF)	Prod.	25,531	(4.2%)	(10.3%)
	Ship.	26,318	+ 4.4%	(7.7%)
N-600 (GPF)	Prod.	81,215	(5.1%)	+ 0.7%
	Ship.	81,166	(2.6%)	(0.5%)
N-700 (SRF)	Prod.	29,833	(1.0%)	(0.2%)
	Ship.	30,319	+ 6.8%	(4.5%)
Total	Prod.	307,584	(6.3%)	(4.7%)
	Ship.	308,438	(3.5%)	(4.4%)
Domestic Shipments (Included Above)		302,473	(1.8%)	(4.6%)
Domestic Share		98.1%		

Markets, news

First quarter furnace black production in the U.S. decreased 5% and shipments 4% from the same 1984 period to 308 thousand metric tons each, according to a Columbian Chemicals report. Demand in all grades was lower except N-100, up 1%. Dry rubber hydrocarbon consumption decreased 4% to 668 thousand metric tons. Demand for natural rubber climbed to a quarterly high, surpassing the previous record of 211 mmt in the first quarter of 1977 by 1%, but SBR was down to the lowest level since the 185 mmt in the fourth quarter of 1982. As the synthetic share of 67.9% was the lowest level in 35 years, carbon black ratio eased from 45.4 phr the year earlier to 45.3 parts per hundred rubber.

In a business restructuring program, **BFGoodrich** announced its plans to divest its chemical plant at Convent, LA which manufactures chlorine, caustic soda and ethylene dichioride; cease making PVC resin at its Long Beach, CA facility; restructure the tire operation that would lower the assets by one-fourth used in the tire business; and divest its Continental Conveyor & Equipment subsidiary. Restructuring in the tire business includes the closing of its Exeter, PA plant that produces nylon tire fabric used primarily in truck, off-road and farm tires. BFG also announced it was relocating the production of its rubber tank linings from its Akron, OH plant to a new plant in Livonia, MI.

Overall consumption of specialty elastomers will grow 6-7% annually between now and 1988 according to a study by SRI International. Demand for copolyester-ethers, fluoroelastomers and other specific products will increase between 12-13%. The higher growth rate expected for some specialties will be fueled by their use in automotive hose, ignition wire, fuel system components, boots and mounts. Consumption of the specialty elastomers was about 170 million pounds in 1983. Manufacture of sealants and adhesives for the construction industry accounted for over 25% of the total, automobiles accounted for 20%.

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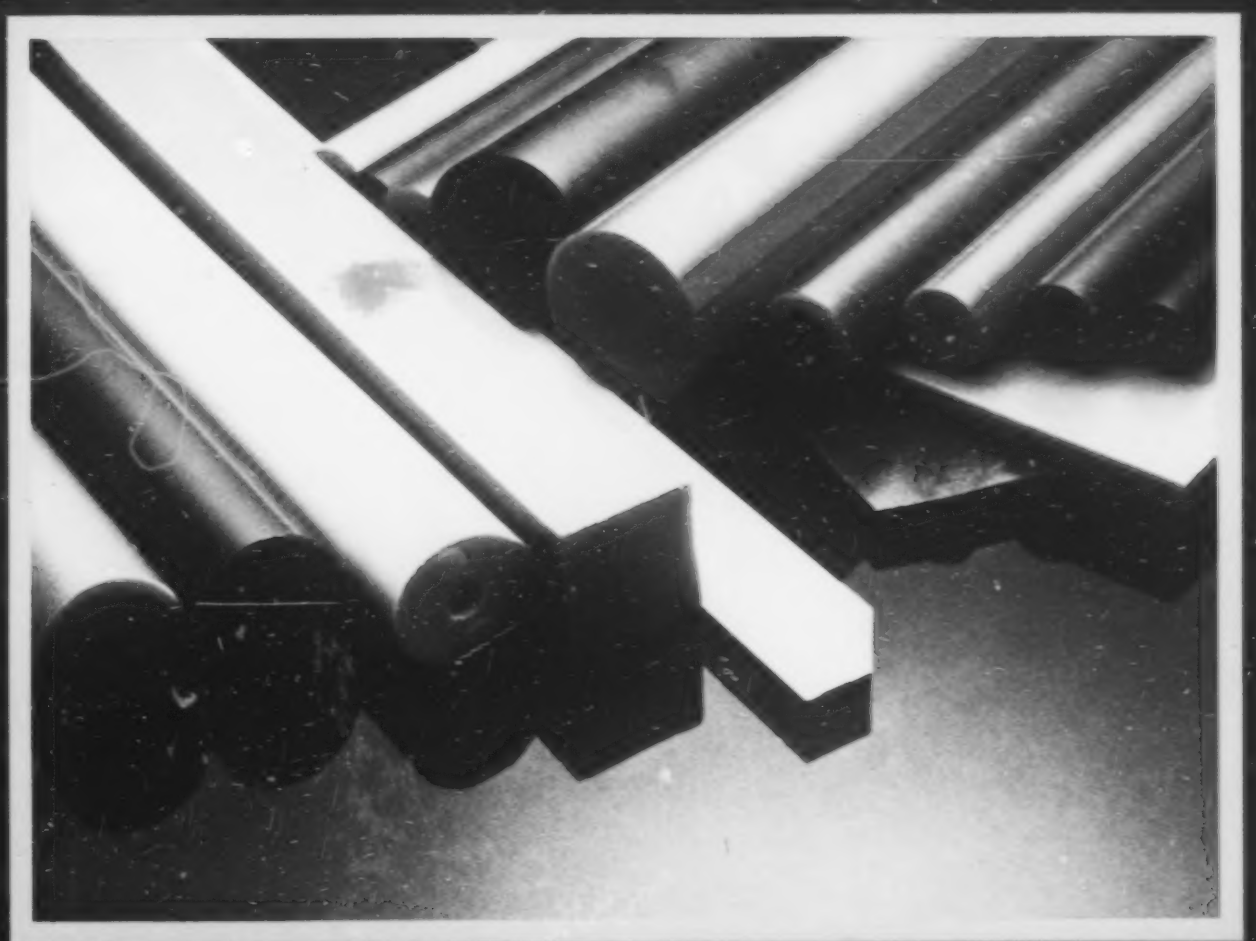
Rubber World

The technical service magazine for the rubber industry Volume 192, No. 6 September 1985

IPN's for vibration attenuation



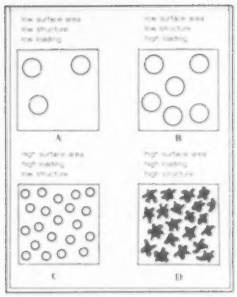
Caytur cured polyurethane

Carbon black selection for conductive compounds

Contents

Vol. 192, No. 6/September 1985

Interpenetrating polymer networks p. 16



Carbon black selection p. 30

Compounding ingredients price list p. 53

5 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

12 Tech Service: Naphthenic oils and OSHA
by Jon Menough, contributing technical service editor. A look at the new regulations and how oils are involved and their effect on manufacturing.

16 Interpenetrating polymer networks for vibration attentuation.
by D. Klempner, L. Berkowski, K.C. Frisch, K.H. Hsieh, University of Detroit and R. Ting, U.S. Naval Research Laboratory. Authors present study on energy absorbing materials based on simultaneous interpenetrating polymer network techniques.

21 Caytur cured polyurethane — new opportunities for fabricators.
by Dr. Ajaib Singh and Dr. Sukhpal S. Thind, Uniroyal, Inc. Article discusses these blocked complexed curatives and includes a new development product showing the opportunities such curatives offer.

30 Carbon black selection for conductive rubber compounds
by R.R. Juengel, Cabot Corp. Author compares six conductive carbon blacks differing widely in surface area and structure properties on the basis of equal compound hardness in order to aid the compounder in selecting the best carbon black grade for specific conductive compound requirements.

44 Patent news
edited by Bob Samples, Akron Rubber Development.

45 Technical Focus — A look at urethane and RIM processing
by David Given, technical editor.

47 Techno Mart
New equipment, instruments, CAD/CAM, products and materials.

53 Compounding ingredients price list
Rubber World's semi-annual survey of chemical and material prices.

Departments

4	Editorial	44	Calendar	70	Literature
37	Meetings	66	Jobs & People	72	Ad Index

Cover

Cover photo courtesy of Mearthane Products

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Business Briefs

Acquisitions, expansions

IPC Limited Partnership, Bristol, NH has initiated several construction and modernization programs including: A 25,600 sq. ft. addition to the IPC-Bristol plant which produces fluoroelastomer engine and oil seals: A 4,500 sq. ft. addition to the silicone mixing facility at Bristol that triples capacity; A 14,200 sq. ft. expansion at IPC-Northfield for silicone engine gaskets; A 5,000 sq. ft. addition to the mill room at IPC-Scottsburg; A 44,500 sq. ft. plant in Salisbury, MD to house its Health Care Products Division and a Class 10,000 clean room is under construction at IPC's Armet Industries subsidiary in Tillonsburg, Ontario for the production of silicone medical products.

Dayco Molded Products will expand its Mebane, NC manufacturing facility by 18,000 sq. ft. with completion scheduled for December.

Compo Industries and **Ausimont S.p.A.**, the specialty chemical subsidiary of Montedison have proposed to merge and form an international specialty chemicals company called Ausimont Compo.

Exxon Chemical installed a semi-works pilot unit to produce new ethylene-propylene copolymers and terpolymers at its plant in France scheduled to start up in the fourth quarter of 1985.

Armak Chemicals has increased production capacity for hydrogenated amines by 30% at its Morris, IL fatty amines plant and also increased quaternary ammonium surfactant capacity by 100%.

Parker Chemical, Madison Heights, MI agreed to purchases Adhesives Consultants Corp., Hayward, CA, Northern Adhesives Co., Elgin, IL and SWK Enterprises, Bridgeton, NJ in separate transactions.

Mohawk Rubber sold its Hudson, OH headquarters building and is relocating to new offices under construction in Fairlawn, OH.

Petrarch Systems, Bristol, PA has established a silicone materials center dedicated to the development and testing of silicone polymers and elastomers for high technology applications.

Blasius Industries' Ness Automatic Machine Products division located in Rochester, NY is undertaking a $1.5 million expansion.

Arizona Chemical Co. moved its headquarters to Panama City, FL, the site of its principal plant.

Dr. Vincent P. Kuceski, formerly vice-president of R&D at C.P. Hall formed **Vincent Associates and Co., Inc.** to help inventors, small companies and research and marketing departments.

Liquid Carbonic will begin construction of an air separation plant in northern LaPorte County, IN in spring of 1986.

Conrac Corp., Stanford, CT sold the assets of its Machine Tool Division, Westminster, CA to **Pasadena Hydraulics Inc.**, City of Industry, CA.

Contracts, licenses

Sheller-Globe, Detroit, MI has entered into a design agreement with William M. Schmidt Associates for the development of concepts and components for future generations of cars and trucks.

The Building Systems Division of **DiversiTech General** and **Dow Chemical** have signed an agreement to market and sell inverted roof membrane assemblies under a single-source warranty program. Construction of the IRMA system would include Dow styrofoam insulation above General's EPDM roof membrane.

Hercules Inc. and Teijin Ltd. of Japan established a development effort to commercialize the "Metton" olefinic reaction injection molding system in the Far East.

Carlisle Syntec Systems announced that **Uresco Construction Materials**, Seattle, WA has added Washington and Oregon to its present representative/distributor territory and **Wilson-Rogers, Inc.**, Des Moines, IA has added southern California.

Pel-Tek Corp., Ellicott City, MD has been named a manufacturers representative for **Hydralign, Inc.'s** web guiding and web handling accessories.

Financial statements

American Biltrite reported net earnings for the second quarter were $1.9 million on sales of $24.2 million.

Armstrong Rubber said net income in the third quarter amounted to $2.3 million and net sales were $210.2 million.

Blasius Industries reported fiscal year net earnings of $997,000 on sales of $41.3 million.

Bridgestone Corp. reported net sales of $1.1 billion for the sixth month period and net profits of $38 million.

Cabot Corp.'s net income for the third quarter was $14.7 million with revenues totaling $513.6 million.

Carlisle's sales for the second quarter were $126.1 million with earnings of $7.5 million.

Compo announced third quarter revenues were $45.4 million and net income was $522,000.

RMA tire shipments & production report through June 1985 (figures in thousands of units)

Passenger Tires	1985	1984	% Change
Shipments			
Original Equipment	29,019	26,972	+7.59
Radial	24,178	22,543	+7.25
Replacement	67,525	71,087	−5.01
Radial	54,146	52,945	+2.27
Export	2,781	3,100	−10.29
Radial	2,235	2,286	−2.23
Total	99,325	101,159	−1.81
Radial	80,559	77,774	+3.58
Production	85,885	88,301	−2.74
Radial	68,140	65,580	+3.90
Truck & Bus Tires			
Shipments			
Original Equipment	4,021	3,995	+0.65
Radial	2,540	2,046	+24.14
Replacement	15,101	15,137	−0.24
Radial	6,349	5,197	+22.17
Export	696	674	+3.26
Radial	361	322	+12.11
Total	19,818	19,806	+0.06
Radial	9,250	7,565	+22.27
Production	17,960	18,654	−3.72
Radial	7,763	7,262	+6.90

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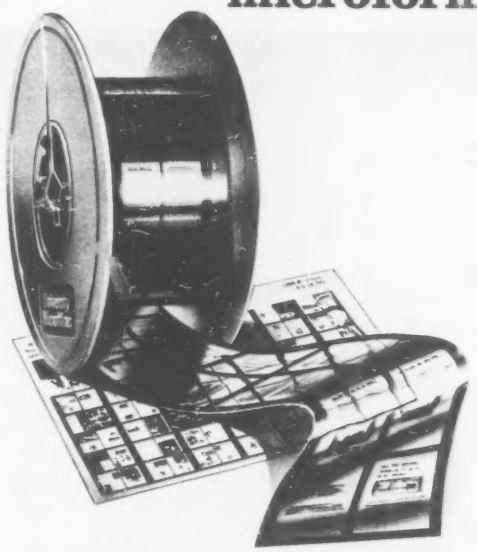

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RMA rubber report through June 1985 (figures in metric tons)

	Cumulative 1985	Cumulative 1984	% Change 85 vs 84
New Rubber			
New rubber available	1,550,957	1,617,033	−4.09
Imports	574,702	525,618	9.34
Exports	188,247	186,888	.73
Apparent Consumption	1,351,169	1,403,238	−3.71
Natural Rubber			
Imports	434,940	408,436	6.49
Exports	20,432	12,570	62.55
Apparent Consumption	415,206	389,288	6.66
% Total new rubber	30.72	27.74	
Synthetic Rubber			
Production	976,255	1,091,415	−10.55
Imports	139,762	117,182	19.27
Exports	167,815	174,318	−3.73
Apparent Consumption	935,962	1,013,950	−7.69
% Total new rubber	69.27	72.25	
SBR			
Production	426,637	500,430	−14.75
Imports	46,775	35,298	32.51
Exports	42,381	54,613	−22.40
Apparent Consumption	433,385	459,177	−5.62
Nitrile			
Production	30,056	33,265	−9.65
Imports	6,510	5,739	13.43
Exports	3,429	3,812	−10.05
Apparent Consumption	32,002	34,952	−8.44
Polybutadiene			
Production	179,608	184,029	−2.40
Imports	36,327	33,850	7.32
Exports	12,374	11,940	3.63
Apparent Consumption	198,001	207,779	−4.71
Ethylene-Propylene			
Production	120,957	114,719	5.44
Imports	503	370	35.95
Exports	17,175	17,893	−4.01
Apparent Consumption	95,872	92,601	3.53
Butyl, Polychloroprene, Polyisoprene, Silicone and other Synthetic Elastomers			
Production	218,998	258,972	−15.44
Imports	49,647	41,925	18.42
Exports	92,456	86,060	7.43
Apparent Consumption	176,705	219,441	−19.47

Dayco Corp. reported third quarter earnings of $3.6 million on sales of $226.4 million.

Essex Chemical reported second quarter earnings of $3.5 million on sales of $58.8 million.

Freeport-McMoRan reported net income for the second quarter of $20.5 million on revenues of $190 million.

Goodyear's net income for the second quarter was $86.7 million on sales of $2.57 billion.

Jones & Vining reported second quarter earnings of $762,000 on sales of $11.6 million.

Lubrizol Corp. said second quarter revenues were $250.1 million and net income was $15.8 million.

Myers Industries reported second quarter earnings of $916,255 on sales of $22.1 million.

NL Industries announced second quarter net income of $6.9 million on sales of $358 million.

Park-Ohio has sales of $52.2 million in the second quarter and a net income of $901,000.

Sheller-Globe reported third quarter earnings of $10.4 million and sales of $240.7 million.

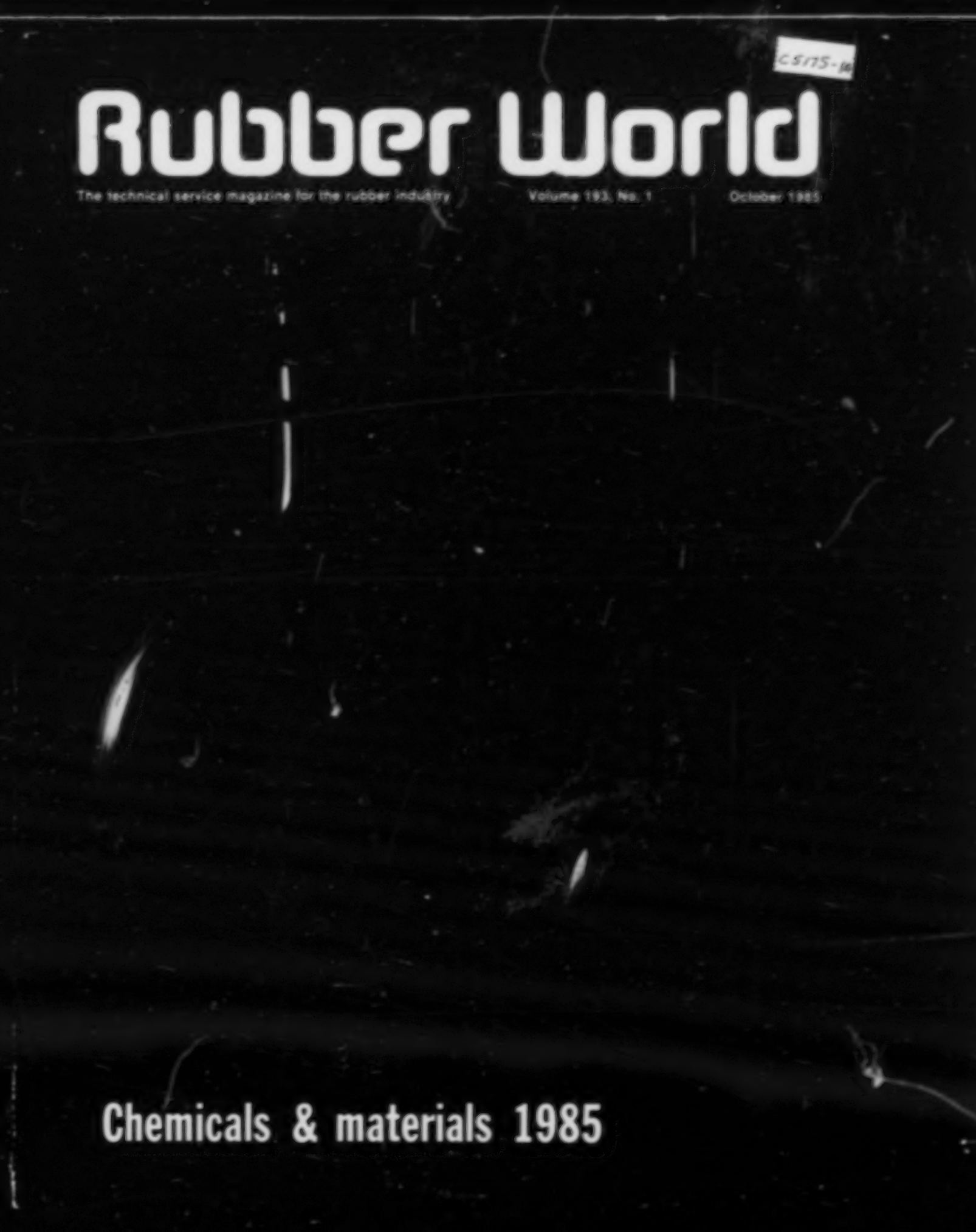
Standard Products reported net income for fiscal year 1985 of $22.7 million and sales were $377.1 million.

Sybron Corp. reported second quarter earnings of $1.5 million on sales of $134 million.

CSITS-10

Rubber World

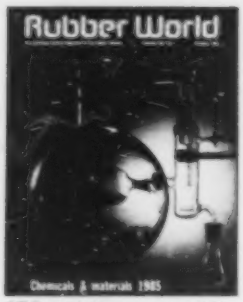
The technical service magazine for the rubber industry Volume 193, No. 1 October 1985



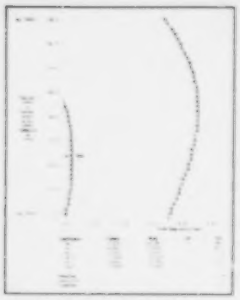
Chemicals & materials 1985

Contents

Vol. 193, No. 1/October 1985



SPC evolution p. 23



Antiozonant protection of sidewalls p. 31

Carbon black and silica p. 51

5 Business Briefs
Acquisitions, expansions, contracts, licenses, financial statements; markets, news.

12 Tech Service: New cavity echnology
by Jon Menough, contributing technical service editor. A look at powdered technology in the production of complex molded cavities for rubber product manufacturing.

16 Quality Management: Quality . . . are you open for business?
by David Crosby, Crosby & Co. New monthly column will look at quality and how to obtain it.

20 Urethane Forum — The Second Wave
by Charles Snoek, Upjohn Co. New monthly column will focus on the urethane industry. The Second Wave discusses opportunities and where the industry is headed.

23 Statistical process control in rubber chemical manufacturing
by Philip R. Parker and Owen E. Dolin, Monsanto Polymer Products Co. Authors examine the "re-evolution" of SPC in rubber chemical manufacturing, and illustrate specific examples of its successes and problems.

31 Long term antiozonant protection of tire sidewalls
by Donald E. Miller, Robert W. Dessent and Joseph A. Kuczkowski, Goodyear Tire and Rubber. Studies provide direction to improving long term tire sidewall protection by using materials which are less volatile and less subject to destruction by direct oxidation.

51 Carbon black is better with silica
by Jean-Yves Germain and Jean-J. Machurat, Rhone-Poulenc. Carbon black/silica combinations will provide a new compromise with a higher performance level than those arising from the use of carbon black alone.

55 New elastomer features improved heat, ozone and sour fuel resistance
by Toshio Miyabayashi and Yasuhiko Takemura. A new fuel- and oil resistant elastomer is examined which is currently under development.

61 Patent news
edited by Bob Samples, Akron Rubber Development.

68 Technical Focus — Thermoplastic elastomer heads new polymers
by David Given, technical editor.

74 Techno Mart
New equipment, instruments, CAD/CAM, products and materials.

79 Corporate profile '85

Departments

3 Editorial
62 Meetings
66 Calendar
109 Jobs & People
112 Literature
116 Ad Index

Cover

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A Lippincott & Peto Publication

RMA industrial products market forecast 1985-1990

Hose — (all reinforced hose, rubber or plastic, except garden hose. It is comparable with the total dollar shipments in the U.S. Bureau of the Census SIC Codes, 30413, 30414, and 30416, minus exports, plus imports.)

1985	1986	1987	1988	1989	1990	Annual Growth
$1115	$1115	$1150	$1180	$1210	$1240	2.5%

Flat belting (all conveyor, elevator and flat transmission belting of rubber or plastic. It is comparable with the total dollar shipments in the Bureau of the Census SIC Code 30411, minus exports, plus imports.)

1985	1986	1987	1988	1989	1990	Annual Growth
$345	$340	$347	$352	$358	$362	+1.0%

V-Belts (all power transmission belts including industrial and automotive other than flat, of rubber or plastic, including belts made for original equipment and replacement. It is comparable with the total dollar shipments in the Bureau of the Census SIC Code 30412, minus exports, plus imports.)

1985	1986	1987	1988	1989	1990	Annual Growth
$500	$495	$510	$525	$540	$555	2.1%

and sealant applications throughout the U.S. and for consumer and industrial applications in the Southwest and West Coast; **Great Lakes Terminal and Transport**, Chicago, will distribute consumer and industrial Kraton east of the Rocky Mountains and **Tiros Plastic**, Yonkers, NY to distribute Elexar rubber for wire and cable insulation and jacketing applications east of the Rockies.

Markets, news

Production of carbon black in the U.S. in the second quarter of 1985 was the lowest since the third quarter of 1983. The 292 thousand metric tons produced is a 15% decline from the same period last year. Shipments of 285 thousand metric tons were 16% lower than the 1984 second quarter according to Columbian Chemicals.

For the first half, both production of 599 MMT and shipments of 593 MMT decreased 10% from the year earlier level. Demand in all grades were down, ranging from 8% in N-600 to 15% in N-500.

Plant inventory rose 7% during the quarter to 102 MMT, a one-month supply, varying from four weeks in N-300, N-500 and N-600, five weeks in N-200 and N-700 to almost six weeks in N-100.

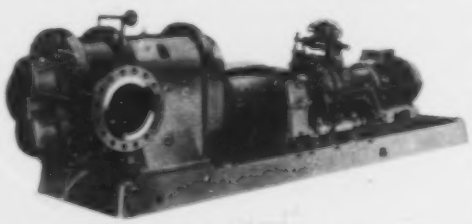
U.S.A. dry rubber hydrocarbon consumption of 595 thousand metric tons was the lowest since the third quarter of 1983, with both SBR and polybutadiene down to the lowest since the first quarter of 1982. Year-to-date consumption declined 5% from the first half of 1984 to 1,263 MMT.

Both rubber ratios during the quarter were lower than the year before: the synthetic share, from 73.7% to 70.8% and the carbon black, from 52.9 to 46.7 per hundred rubber.

The Industrial Products Division of the Rubber Manufacturers Association annual forecast for the next five years shows little growth in all reporting segments. The forecast for growth through 1990 will be slightly more than 2% which is keeping with the historical growth trend for hose and belting. The RMA felt that the pickup in economic activity experienced by the industry in late 1984 and the first six months of 1985 should begin to ease up during the latter part of 1985. The general view is that current economic conditions are in a holding pattern which any shock could send into an economic recession. The industry's strong dependence upon both the automotive and mining sectors of our economy are likely to place the industry at the lower end of any growth pattern during the coming years. The totals shown for each product (see table) represent United States demand. This includes domestic shipments less exports, plus imports. Forecasts for 1985 through 1990 are in millions of dollars, and are at a fixed level in constant dollars, at the value of the dollar in 1985. The forecast is based on information from 70 companies.

BIG **BIG** **BIG**

Lederle Rotary Piston Pumps



- Rated Capacities to 250 cubic meters per hour.
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